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SOCIAL ATTITUDE (CALIFORNIA F SCALE) AND CONVULSIVE THERAPY

ROBERT L. KAHN, PH.D.,[1] MAX POLLACK, PH.D. AND MAX FINK, M.D.

Studies of the mode of action of convulsive therapy in altering behavior have been under investigation by a variety of experimental methods in our laboratory for several years. Early studies demonstrated a relationship between clinical evaluations of improvement and the degree of altered brain function as measured by the amobarbital test (15) and the electroencephalogram (5). Personality patterns related to a favorable therapeutic outcome have been defined by family interviews (13) and projective techniques (14). Behavioral changes have been measured by complex visual and tactile perceptual tasks (6) and by analyses of changes in syntactical aspects of language (12).

More recently we have become increasingly aware of the relation of sociopsychological factors to differences in both referral for, and response to, convulsive therapy. In a study of the entire adult in-patient population of Hillside Hospital it was found that those patients referred for convulsive therapy were significantly older, more likely to have been foreign-born, had less education and higher scores on the California F Scale than those patients who received psychotherapy alone (17). Of those patients receiving convulsive therapy, a favorable therapeutic evaluation of *recovered* or *much improved* was most likely in those who were older, more poorly educated, foreign-born and with higher F scores (18).

The aim of the present investigations was to study the convulsive therapy process further by the use of the California F Scale (1). Although promulgated in a setting where interest was focused on prejudice and authoritarianism, the F Scale was designed to evaluate psychological aspects, such as conventionalism, rigidity and stereotypy, related to the manifestation of these social attitudes.

It was our specific purpose to determine: 1) what the F Scale measures in a psychiatric population, and 2) how response to the F Scale varies with change in brain function.

METHOD

Population: These studies have been conducted at Hillside Hospital, a private, nonprofit 200-bed psychiatric hospital in New York City admitting voluntary patients with "early and curable mental illness." Psychoanalytically-oriented psychotherapy is the treatment of choice for all patients, with somatic therapies (convulsive, insulin coma and drug therapies) regarded as ancillary, but available when needed. The in-patient population consists mainly of middle-class Jewish patients, with a high school education, between the ages of 18 and 40. Most patients are classified into the diagnostic categories of schizophrenia, psychoneurosis, manic-depressive and involutional psychosis.

In these studies we have used a ten-item modification of the standard F Scale (8).

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[1] Department of Experimental Psychiatry, Hillside Hospital, Glen Oaks, Long Island, New York. This investigation was supported in part by grants M-927 and MY-2092 from the National Institute of Mental Health, National Institutes of Health, U. S. Public Health Service. This paper derives from a presentation given at the Annual Meeting of the Eastern Psychological Association, Philadelphia, April, 1958.

TABLE 1

Scores on Conventional and "Reverse" F Scales

Dichotomized Groups	N	Mean Score Conventional Scale	Mean Score "Reverse" Scale	Diff.	*t*
10–37	76	26.3	51.5	+25.2	20.3*
38–70	79	47.4	48.1	+0.7	0.6

* Significant at .001 level

The procedure consists of having the subject read ten statements and indicating to what extent he agrees or disagrees with each, *i.e.* a little, pretty much, or very much. The score for each item ranges from one to seven, and the total score range is 10 to 70, with high scores indicating greater agreement with the statements. The statements are extreme, uncritical or stereotyped expressions, such as: "No sane, normal, decent person would ever think of hurting a close friend or relative" and "If people would talk less and work more, everybody would be better off."

RESULTS

What the F Scale measures in this population: the "reverse" F Scale. In this study the entire in-patient population was first tested with the conventional scale, then retested one month later with a "reverse" scale (2). In the "reverse" scale the same items are used, but stated in opposite terms to the original. Thus, the first example cited above is changed to read, "A sane, normal, decent person might have to hurt a close friend or relative." The "reverse" scale is scored in the same manner as the regular scale, with high scores reflecting greater agreement.

The relation of the scores on the conventional to the "reverse" scales is shown in Table 1. The patients were divided into two groups according to the median score on the conventional scale. Those patients who made low scores initially, indicating predominant disagreement with the statements, showed a significant increase in score on the "reverse" scale, indicating that they were now in agreement with the statements. In contrast, the patients who made high scores initially showed little change on retesting, indicating that they agreed with the statements to the same extent even when their meanings were reversed.

Change in F Score with convulsive therapy. In a second study, 69 consecutive hospitalized patients referred for convulsive therapy were given the F Scale in the week prior to treatment, on the day following the 12th treatment, and two weeks after the termination of treatment. These patients were divided into two groups; an experimental group of 59, and a control group of ten patients randomly selected from the referrals. In the experimental group all patients received grand mal convulsive therapy, while the control group received subconvulsive electro-stimulation only. All patients were treated three times a week, for a minimum of 12 treatments.

The degree of physiologic change during treatment was determined by quantitative analyses of delta activity in the EEG, using techniques previously described (5). EEG records were obtained weekly and the records taken nearest the 12th treatment were measured for the degree of induced slow wave activity (the per cent time occupied by waves of 6 cps or slower for 66 seconds of recording from the anterior temporal-vertex leads).

The changes in F score during convulsive treatment are shown in Table 2. There was a mean increase of +5.7 in F score during

TABLE 2

Effect of Convulsive Treatment on F Score

	N	Mean F Score			
		Pre-Treatment	During Treatment	Mean Difference	*t*
Convulsive Group	59	45.3	51.0	+5.7	2.02*
Control Group	10	48.7	49.2	+0.5	0.02

* Significant at .05 level

treatment, a difference significant at the five per cent level of confidence. In contrast, the control group showed a statistically insignificant change during the same period.

The effect of convulsive therapy on the F score was further demonstrated by an analysis of seven patients, originally in the control group, who were subsequently placed on a regular course of convulsive therapy. On retest after 12 control treatments their scores were unchanged, with a mean difference from the pretreatment score of +0.1. After 12 convulsive treatments, however, these patients showed a significant mean increase of +9.1.

Adequate EEG records at the time of the 12th treatment were obtained for 54 patients. For this analysis the records were divided into two groups according to the degree of slow wave activity: a high delta index group in whom slow wave activity appeared in 40 per cent or more of the selected leads, and a low delta index group in whom the slow wave activity was less than 40 per cent. Changes in F scores during treatment for the two groups are shown in Table 3.

TABLE 3

Change in F Score and Degree of Induced Cerebral Dysfunction

Degree of Slow Wave Activity	N	Pre-Treatment	During Treatment	Mean Difference	t
High Delta Index	27	43.9	52.5	+8.6	2.3*
Low Delta Index	27	45.6	49.0	+3.4	0.8

* Significant at .05 level

The patients with high degrees of slow wave activity had a mean increase in F score of +8.6, significant at the five per cent level of confidence. Those patients with low delta indices showed a relatively small increase of +3.4. While the increase in scores in the low delta activity group was statistically insignificant, it was greater than that of the control group (Table 2).

TABLE 4

Pre-Treatment and Post-Treatment F Scores

	N	Pre-Treatment	Post-Treatment	Mean Difference	t
High Delta Index	21	42.2	40.6	−1.6	0.4
Low Delta Index	16	42.6	42.1	−0.5	0.1

F scores were obtained in 44 patients two weeks after the last treatment (Table 4). The mean difference between pre- and post-treatment scores was statistically insignificant. Furthermore, the same pattern of a small decrease in score was found for both the high and low delta activity groups.

DISCUSSION

These observations demonstrate the relevance of the F Scale to the convulsive therapy process. An understanding of these relationships requires examination of the psychological factors reflected by the F Scale in our population.

The observations on the "reverse" F Scale indicate that those patients who disagreed with the original statements (low F score) were responding to the content of the statements. This was shown by the high degree of agreement with the reverse statements. Those patients who agreed with the original statements (high F score), however, continued to agree when the statements were reversed. Evidently, these patients were not responding to the content of the statements, but demonstrated a more generalized reaction.

There have been several studies on nonpsychiatric populations using a "reverse" F Scale, with conflicting results. Thus, Christie, Havel and Seidenberg (3) have found a consistent response to content in original and reverse scales, *e.g.*, agreeing to one and disagreeing with the other, while Jackson, Messick and Solley (10) report a positive correlation between agreement on the two scales. In part, these differences may be accounted for by differences in the form of the reversed scale. Jackson and Messick (9) indicated that Christie *et al.* (3) modified the language form of the original scale and reversed the content, while Jackson *et al.* (10) retained the extreme, cliché-ridden style of the original scale. Jackson and Messick indicate that the response pattern to the F Scale may be interpreted in terms of response style rather than specific item content. On the basis of the data from our population there is a difference between the high and low scorers with respect to the extent that cognitive style affects their response. The high scorers who agree with both forms of the scale show a consistent style of response acquiescence, overgeneralization and conforming to socially desirable standards. Those who scored low on the original scale, however, did not show the converse—a consistent pattern of negativism or social non-conformity. Rather, they altered their style to agree with the content when the statements were reversed. Thus, low F score patients were characteristically more critical and discriminating persons, while those with high F scores were more undifferentiating and stereotyped in their reactions.

With this conception of the F Scale, the findings in convulsive therapy may be considered. In the selection of treatment in this institution, those patients receiving convulsive therapy had significantly higher scores than those receiving psychotherapy only (17). That this observation is not simply a reflection of diagnosis is seen in the differentiation by the F score of the selection of treatment even among those patients classified as psychotic depression. The selection of treatment thus seems related to psychological processes reflected in the F Scale. Subjects with high F scores, with stereotypy of thinking and difficulty in introspection, often present a behavioral pattern incompatible with the establishment of the type of interpersonal relationships required in psychoanalytically-oriented psychotherapy.

The favorable evaluations of therapeutic response to convulsive therapy in patients with high F scores may be related to personality attributes. The psychological processes reflected in the F Scale are similar to those personality factors previously found to be related to a favorable response to such treatment. In structured family interviews it was observed that the favorably rated patients had personality patterns characterized as nonempathic, nonintrospective, nonverbally communicative, and highly conventional and stereotyped, with little imaginative or creative capacity (13). Consistent patterns have been shown in Rorschach studies indicating that good prognosis is related to a small number of responses, absence of human movement and little diversification of content (7, 14).

The F score increases significantly with convulsive therapy with the extent of increase related to the degree of altered brain function, as measured by the degree of induced EEG slow wave activity. This relation of change in behavior to physiological change is an observation that has been consistently noted in convulsive therapy patients (5). The increase in F score during treatment may have been even more marked than actually observed. Several patients of foreign birth and little education had maximum or near maximum scores prior to treatment, thus eliminating or reducing the possibility of an increase on retesting.

The change in score with altered brain function is consistent with previous observations on the behavioral effects of convulsive therapy. In accord with our conceptual framework, greater agreement with F Scale items during treatment is related to increased stereotypy and difficulty in discrimination, as well as to increased acquiescence. This is part of a general process which has been noted in linguistic, perceptual and clinical behavioral measures. In their language, convulsive therapy patients show increased denial, evasion, qualification and use of clichés and stereotyped expressions

(12). They also manifest increased repetitiveness of words (11), difficulty in complex visual and tactile perception (6) and figure-ground discrimination (16). Clinically, they are characteristically more compliant and acquiescent and try to please the examiner (4).

SUMMARY

A measure of social attitude, the California F Scale, has been utilized in studies of the convulsive therapy process. In a voluntary psychiatric hospital it was noted that patients referred for convulsive therapy had significantly higher F scores than those receiving psychotherapy only. Among the patients receiving convulsive therapy, those with the higher initial F scores were evaluated as showing the best clinical results. With treatment there was a significant increase in F score, with the increase related to the degree of altered brain function. Following treatment the scores returned to their original level.

Comparison of results with a conventional and "reverse" F Scale demonstrated that patients with low F scores respond to the content of the questionnaire, while those with high F scores showed a generalized pattern of agreement independent of the content.

These results are interpreted in terms of the psychological processes measured by the F Scale. High-scoring patients are considered to be stereotyped in their thinking and to have difficulty in introspection—behavior which is incompatible with psychoanalytically-oriented psychotherapy, rendering them more liable to referral for convulsive therapy. With treatment, such patients are also more likely to develop the language patterns of denial and use of clichés which are the cues for evaluations of clinical improvement. The increase in F score with treatment is comparable to other types of behavioral change, such as increased acquiescence, increased difficulty in figure-ground discrimination, and increased stereotypy of language.

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COMMUNICATION OF "THERAPY VALUES" BETWEEN THERAPIST AND SCHIZOPHRENIC PATIENTS

MORRIS B. PARLOFF, PH.D.,[1] BORIS IFLUND, PH.D.
AND NORMAN GOLDSTEIN, M.D.

This paper reports the development of a research technique designed to facilitate the study of some aspects of the process of psychotherapy. Its use will be illustrated by citing some results from the study of psychotherapy with paranoid schizophrenic patients. The material is primarily illustrative rather than hypothesis-testing and is presented in the form of a comparative case study of the treatment course of two patients, one who subsequently improved and one who did not.

The research method to be described attempts to provide a relatively simple index of change. The technique may provide a useful point of departure for the investigator who is concerned with studying the conditions associated with therapeutic events.

In undertaking the study of process of therapy, it is useful to conceptualize psychiatric treatment in terms of communication. Communication is viewed as both the agent and object of psychotherapy. It is the agent in the sense that changes in the patient's behavior and attitudes are mediated by verbal and non-verbal communication between therapist and patient. It is the object of therapy in that psychotherapy is a procedure whereby the patient's communications within himself and with others are improved.

In psychotherapy the participants attempt to communicate in order to influence each other's behavior to their own satisfaction and to modify each other's interpretations of their communications. A significant part of what is communicated consists of the participants' values regarding the content, process and techniques of therapy.

The therapist brings to therapy a system of values or preconceptions regarding his role as therapist and the ways in which he can utilize social interactions to influence the patient. Communication of these values includes instructing the patient in a set of procedures, such as free association, progressive relaxation, etc. Many writers have noted that the patient's verbalizations tend to become consonant with the particular psychodynamic theories of the therapist. Freud (1) reported that some of his patients invented memories in support of his theories of neurosis. Stekel (4) similarly observed that patients' dreams were produced in the forms that were most pleasing to the therapist. Heine (2) found that patients, each having completed treatment with a therapist from one of three different schools, expressed the reasons for their improvement in terms of the theoretical system of the school of their particular therapist.

Less well recognized is the fact that the patient also has values regarding self, others, and therapy. In a treatment situation these values are expressed in his attempts, most of which are unconscious, to influence the therapist's perception and responses.

An analysis of the communication of values is pertinent to research on the process of therapeutic change in that it offers an opportunity to focus on a pair of treatment-relevant variables: 1) the objectivity of each participant's perception of the other's values, and 2) the extent of mutuality or congruence of the patient's and therapist's values.

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[1] Laboratory of Psychology, National Institute of Mental Health, National Institutes of Health, Bethesda, Maryland. Dr. Iflund's present address: Nowlands & Company, Paris, France. Dr. Goldstein's present address: Mayo Clinic, Rochester, Minnesota. The writers gratefully acknowledge the assistance of Mr. James Kincannon for his statistical analysis of the data and his many helpful suggestions.

Objectivity is an important variable since many therapists set themselves the task of attempting to understand the patient's productions and of validating such understanding by communicating relevant aspects to the patient. The therapist's accuracy in understanding the patient's communications may, therefore, be important in the treatment process. One characteristic of patients is their distorted view of themselves and of others; a goal of therapy is to help the patient more accurately to perceive others and to appraise his impact on them.

The concept of congruence is also relevant to effective psychotherapy, in that it is necessary to achieve a consensus between the therapist and patient on at least two levels: 1) agreement that certain issues are worth investigating further, and 2) agreement on the interpreted "meaning" of given content or process.

The value system which is most directly at issue in the treatment situation pertains to the actual content and affect expressed in the treatment hour. The greatest opportunity for learning would occur, therefore, at the relatively low level of inference required to recognize values in terms of the importance that each participant attaches to the material brought up in the course of the hour. In this paper, the meaning of "value" will be limited to the degree of importance the therapist and patient attribute to the content introduced by the patient. In this sense, the term "value" has no implication of ethical standards or moral precepts. It is assumed that to the extent that patient and therapist effectively communicate with each other, they will reveal 1) objectivity: an increasingly accurate perception of what the other believes important in therapy, and 2) congruence: a growing similarity or mutuality of such evaluations.

Since the authors wished to study the communication of "therapy values" between therapist and patient, the following specifications were required of the research technique. 1) Judgments regarding therapy values expressed in the course of therapy were to be obtained from the patient and the therapist. Since both evaluated the process of therapy in terms of their perception of events, the participants were considered the best qualified judges. 2) The tasks required of the patient had to be appropriate to the capacities of a reasonably large segment of patients, including some schizophrenic ones. Recognizing that schizophrenics vary widely in their capacities, it was decided to limit this study to patients whose cognitive functioning was fairly intact. 3) The method had to be simple enough to permit the analysis of a complete course of psychotherapy or as large a portion of it as desired. Most of the techniques currently reported in the literature are of a tedious and complex nature. Although it is not a requirement of science that either the method or the subject matter be simple, the complexity of many methods of data analysis permits the investigator to scrutinize only a tiny fraction of the material available to him. Some of the flavor of the problem confronting the investigator who undertakes a detailed process study is reflected in a comment made by Auld and Dollard after three years of work on the development of a quantitative method for the study of psychotherapy hours: "When psychologists go to Hell, they will surely be assigned some form of content-analysis. . . . "

METHOD

Our procedure, adopted after a period of trial and error, was applied to the study of one psychiatrist's treatment of two male schizophrenic patients, Mr. A, age 34, and Mr. B, age 42, for a period of approximately one year each. The treatment period referred to in this study represents the first hospitalization for each. Each patient agreed, before his admission, to participate in the therapy and research program, which was carefully outlined to him.

Therapy sessions were observed from behind one-way vision screens by two clinical psychologists who had had eight to ten years of experience in the field of psychotherapy research. The observers' task was to record the manifest central issues with which the patient was concerned. Each issue or topic was written on one side of a 3″ x 5″ card as the patient brought it up. On the reverse side of the card the therapist's verbal response, if any, to the topic was recorded. By the end of the hour a sample of the hour's total content was available for immediate evaluation.

A topic was defined as a phrase, sentence, or set of sentences which summarized an idea or attitude expressed by the patient. Each new topic represented a shift in subject. Examples of patients' topics are: 1) "My family had just one common interest and that was hating me," and 2) "If one has faith in the child he will do anything for you."

The number of topics per session ranged from nine to 24 with a mean of 15. The observers carefully recorded only verbal interactions since any report of non-verbal content that was not commented on by either therapist or the patient might be interpreted by one or both of the participants as a confrontation or interpretation.

Following a training period, the observers found that they could independently select for recording the same topics with approximately 80 per cent agreement. The degree of agreement was periodically retested throughout the research and remained consistently high.

Immediately following each session an observer presented the patient with the recorded set of topics for that day. The cards were presented in random order. The patient was then asked to read topics aloud in order to make certain that the patient 1) had read the topic correctly, and 2) accepted the statements as a fair representation of his actual comments. He was then asked to rank order them from most to least important to him for that particular hour.

It was hoped that the presentation of the topics immediately after the interviews would stimulate the recall of the relevant discussion in all its richness including the accompanying affect and contextual meaning.

After therapy had been in progress for nine months with patient A and seven months with patient B, an additional task was introduced. The patient was asked to predict the rank-order of importance that the therapist would assign to each topic. This procedure was not introduced at the beginning of therapy since it was thought that it might artificially direct the patient's attention toward the issue of discrepancy-similarity between himself and the therapist.

An intervening task, lasting 20 to 30 minutes, was interposed between these two sortings in order to reduce the influence of memory on the second sorting. The patient was to characterize the therapist's efforts at communicating with him during the immediately preceding treatment session. A twenty-five item "communication rating scale" was devised for this purpose.

On each occasion after the patient had completed these tasks, the therapist was asked to rank order the cards in accordance with his conception of their importance for therapy. The therapist reported that he assessed importance according to the topic's relevance in clarifying the patient's psychodynamics. He was then asked to predict the patient's sorting of each topic. Neither patient nor therapist was given any information regarding the accuracy of his predictions.

To summarize, then, the basic sources of data were the following: 1) the patient's own evaluation of topics, 2) the patient's prediction of the therapist's evaluation of the same topics, 3) the therapist's actual ranking of topics, and 4) the therapist's prediction of the patient's ranking.

An operational definition of the therapist's understanding of the patient's values was obtained by comparing the therapist's prediction of the patient's daily sorting with the patient's actual sorting. Similarly, the patient's understanding of the therapist's values was derived from a comparison of the patient's prediction of the therapist's sorting with the therapist's actual sorting. A measure of congruence was obtained by comparing the therapist's ranking of a set of topics with the patient's ranking of the same set. These comparisons were made by means of two statistical operations: 1) analysis of the several rankings of the day's topics by means of the Spearman rank-order correlation, 2) analysis of the extent of agreement between therapist and patient evaluations when each daily set of rankings was dichotomized; topics given ranks above the daily median rank position were classified as important while topics falling below the daily median were designated as unimportant. The significance of this agreement was tested by chi-square.

In considering some of the findings, it is of interest to keep in mind that Mr. A has remained substantially unchanged to date after a period of three and one-half years of intensive individual psychotherapy. Mr. B, on the other hand, was discharged as recovered after one and one-half years of treatment, and has maintained his gains over an interval exceeding two years. The experimental period of one year does not include the final six months of Mr. B's treatment.

Therapist's Understanding of Patient's Values. With neither patient did the therapist's predictive ability, i.e. understanding, show any statistically significant change, although the therapist's "understanding" of Mr. B tended to improve. This was reflected in the fact that during the initial period, the therapist's accuracy was roughly 50 per cent, or chance; while in all the remaining periods his predictions clearly exceeded chance. The overall level of prediction which he achieved in each case was statistically significant. The average accuracy with which the therapist predicted whether a topic would be classed as important or unimportant by the patient was 58 per cent for patient A and 61 per cent for patient B. No statistically significant differences were found between the degrees to which the therapist understood either patient throughout the entire experimental period.

Patient's Understanding of the Therapist's Values. Each patient's overall predictive accuracy was found to be statistically significant, that is, his ability to perceive correctly the therapist's values was greater than chance. It will be recalled that the patient's prediction of the therapist's sorting was introduced into the experiment only during the last three months of the study, which limits the comparisons and conclusions that could made. The major learning experience may well have occurred much earlier. During the interval studied, neither patient showed any significant increase in "understanding" of the therapist's values. Mr. B unexpectedly showed a rather precipitous decline in accuracy near the end of the experimental period which was significant at the .01 level.

The only significant difference between the patients was again found in the last period of therapy. Patient B's predictions became so poor that by contrast patient A's understanding was found to be significantly more accurate.

In comparing the therapist's and patient's understanding of each other's values for comparable periods, it was found that each could predict the ranking of the other above chance. However, in general, no significant differences were found between the therapist's and the patient's level of accuracy. During the final period of the study the therapist's understanding of Mr. B was found to be significantly greater than B's understanding of the therapist. This difference was principally due to the fact that the patient's ability to predict the therapist's evaluation of content had declined sharply; rather than to an increase in the therapist's understanding of the patient's "therapy values."

Thus, the degree to which participants understood each other's values was significantly above chance but failed to show any increase during the periods studied and showed little difference between therapist and patient.

Congruence. It was hypothesized that the effectiveness of therapy would be reflected in an increased congruence between the patient's and therapist's evaluation of therapy topics. In plotting the series of daily correlations for Mr. A, it was apparent that the resulting curve was cyclical. Inspection revealed that the correlations varied with the day of the week. With the approach of the weekend break in therapy, the patient's correlation with the therapist decreased; at the beginning of a new week of therapy, the correlations again increased. By statistical test the mean correlation between the therapist's and patient's values was significantly higher for Mondays, Tuesdays and Wednesdays than for Thursdays and Fridays ($p < .02$). A comparison between Fridays and Mondays makes the point even more dramatically. In the course of 18 Fridays, 13 (72 per cent) of the correlations between the patient and therapist were found to be *negative* while of 20 Mondays, 16 (80 per cent) showed positive correlations.

During the initial six weeks of Mr. A's therapy the overall congruence increased significantly ($p < .05$); however, no further increase was found during the remaining months of the experiment.

For Mr. B congruence was found to increase significantly over the course of therapy ($p < .01$); however, for reasons that are as yet unclear, during the last 15 sessions of the study congruence decreased sharply ($p < .05$).

During the initial period of treatment no difference was found between the patients in the degree to which their values coincided with those of the therapist. After approximately eight months of therapy, however, Mr. B was found to be significantly closer to the therapist's values than was Mr. A ($p < .01$).

DISCUSSION

The method of assessing participants' "understanding" depends on the participants' ability and willingness to do the tasks. As a partial test of the participants' capacity to perform the tasks, the test-retest reliability was measured. The average reliability of the therapist was found to be .92; Mr. B's was .81, and Mr. A's, .33. The first two are obviously quite adequate but Mr. A's was not. When he was questioned regarding his understanding of the test-retest task, he explained that the examiner was obviously dissatisfied with the way he had sorted the topics the first time. He was, therefore, simply trying to sort them differently. When the purpose was re-explained to him, the test-retest correlation jumped to .72. It was concluded, therefore, that the participants were able to do the task. The internal consistency and regularities found in the data indicate that the participants were willing to perform the task and were not simply acting capriciously.

Congruence, as defined here, may occur under two quite different sets of conditions: 1) when the patient and therapist are defining their universe of discourse and agreeing that certain events are more important than others for purposes of their work together, and 2) when the patient and therapist agree on the "meaning" of these events. Without attempting to define the type of congruence which the participants evidence at any given time, it can be agreed that both possibilities are significant to psychotherapy.

A major question that is raised by this method is, of course, the influence the method itself exerts on the very process of therapy that one sets out to study. That these procedures had meaning for the patients was clear from their comments. One reported, for example, that the experimental procedures helped him to review each hour and were therefore the true therapy, while the therapy itself must be the research since it consisted of his giving information about "schizophrenia." The other indicated that it was rather ego-enhancing to have three doctors working with him because other patients had only one. He interpreted this fact as evidence that his potentialities were being properly recognized. On the other hand, he occasionally referred to the microphone and one-way screens as limiting the kind of material that he felt free to introduce.

No clear experimental data were gathered regarding the effects of these procedures on therapy. Gross attempts at assessing their influence were made, however, by introducing periods in which no observation or testing was undertaken. The therapist was asked to compare the material presented by the patient in observed and unobserved sessions to determine whether, in his clinical judgment, he could see any differences in the following areas: 1) introduction of material not previously discussed, 2) level of intimacy of material presented, 3) changes in patient's relationship with the therapist, 4) changes in the therapist's feeling of comfort, and 5) changes in the therapist's feeling toward the patient. The therapist's report was that he could detect no change on these variables between periods. It must be pointed out that these judgments of a therapist may have been biased by his desire to continue the research. However, since clinical responsibility was primarily the therapist's, it was decided that his judgment would be the deciding one. It is further noted that the therapist was being carefully supervised in his treatment during this study. Whatever the effect of these procedures, one patient was discharged as improved and has retained the benefit for a considerable period. The other patient has remained in therapy for an additional two years without appreciable change.

Although the primary intent in presenting findings is to illustrate the method, it may be of interest to speculate regarding some of their possible implications.

Mr. A's cyclical congruence curve may indicate the importance he attached to the therapeutic relationship. The fact that congruence varied systematically with the weekend suggests that as the weekend suspension of therapy approached, his mounting anxiety or resentment disrupted his performance of the tasks, but with the therapist's return to him on Mondays, he experienced relief and his efficiency increased.

The fact that Mr. B, who later improved, shifted his values toward the therapist's significantly more than did Mr. A supports a finding of Rosenthal (3) that patients who improve move toward the therapist's values more than those patients who do not improve. The fact that Mr. B's "understanding" and "congruence" of values declined during the last fifteen sessions of the experimental period raises an important but unresolved problem. Although psychotherapy continued with this patient for an additional six months prior to his discharge, these sessions were unfortunately not studied by the methods described. It is, therefore, not clear whether the lapse was a temporary one reflecting merely a transitory stage of resistance, for example, or a more lasting change related to the resolution of transference in which the patient was attempting to differentiate himself from the therapist. Quite apart from the issue of whether this was a temporary or enduring change, there is evidence that Mr. B was clearly attempting to dissociate himself from the values he imputed to the therapist and to appear independent of them. This conclusion is based on an analysis of the correlations between the patient's ranking of his own values and the ranking he attributed to the therapist. Previously, Mr. B, like Mr. A, tended to overestimate the degree of similarity between his own and the therapist's values.

These findings further suggest that with regard to the concept of "congruence," evidence of *change* may be the relevant aspect while with the concept of "understanding" the absolute *level* may be more significant than *change*.

The technique helped to point up change occurring in therapy which was not recognized by the naked clinical eye or even by the third ear. The change, for example, in Mr. B's performance during the last period of the study was quite remarkable and yet was detected neither by the therapist nor by the researchers until an analysis of the data had been made.

Finally, the authors regard this technique of studying "understanding and congruence" of therapy values as offering an important tool for identifying an essential element in the process of therapy. This permits tracing some changes occurring in therapy in the same sense that a topographic map indicates the variations in the terrain. This method, however, is no more than a guide to the richness and detail of the territory of therapy and must not be confused with the territory itself.

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ATTITUDES TOWARD THE USE OF PLACEBOS IN TREATMENT

ARTHUR K. SHAPIRO, M.D.[1]

The endeavor to understand is the first and only basis of virtue.—Spinoza

INTRODUCTION

Attitudes toward the use of placebos in treatment require some comment at this time for several reasons. There is little unanimity of opinion about the indications for their use, though the subject has been discussed extensively; there is a marked discrepancy between the attitudes of psychiatric and non-psychiatric physicians regarding their use; and the delineation by psychiatrists of the underlying motives have illumined both the question of the use of placebos and some of the factors operating in the placebo effect itself. In previous papers the history of the placebo and the placebo effect was discussed (73, 74). This history would be incomplete without comment about psychiatry's unique contribution in this area.

In this paper we will review the attitudes of physicians toward the use of placebos as a therapeutic measure, contrast the attitudes of psychiatric and non-psychiatric physicians and discuss the findings and some of their implications.

ATTITUDE OF NON-PSYCHIATRIC PHYSICIANS TO PLACEBOS

While occasional non-psychiatric physicians are adamantly opposed to the use of placebos (13), or tend to be almost unqualifiedly opposed (15, 35), most support their use, either unqualifiedly (59), almost unqualifiedly (5, 17, 33, 42, 46, 54, 77), or strongly in general but with various qualifications, considerations or cautions (1, 14, 18, 19, 20, 22, 23, 38, 44, 60, 81, 82). (See Figure 1.) In the interests of brevity individual non-psychiatric ideas on the use of placebos will not be given, but a summary (quotations for the most part) of the indications, contra-indications, arguments for and against, and other comments about placebos will be listed below.

INDICATIONS

For patients with incurable diseases (19, 59), diseases for which there is no available specific treatment (18, 19, 20, 54, 77), and for patients with malignant or degenerative diseases where no adequate treatment is known and the truth may be very harmful (14, 46).

For patients in hospitals for prolonged investigation (14, 59, 77), to relieve distressing symptoms (1, 20, 44, 59), and the impatience of patients while undergoing these tests (46, 54, 59, 77). A placebo can be substituted and dissipate a confusing clinical picture of a patient taking a conglomeration of drugs (1, 46, 54).

Elderly or chronic patients who have become used to placebos (19), and for postoperative patients being weaned away from opiates to prevent habituation (20, 77).

In research and double blind studies (5, 19, 20, 46, 54).

For some unintelligent or inadequate patients who may be helped by a placebo (20), patients with disordered and deluded imaginations (22), for untutored or anxious patients (38), as an aid in diagnosis of psychoneurosis (60, 81), for patients with psychoneuroses and occasionally in psychoses in remission (81), as a means of reinforcing a patient's confidence in his recovery (19), as adjuvant therapy as a temporary stopgap in those cases of constitutional disease in which psychic factors play an important contributing part (46), for psychoneurotic patients who need a material sign to establish confidence so that they may benefit from the psychotherapy that follows (14), in certain ailments arising out of mental illness (5), and in patients with strong dependency needs (46) for emotional security the placebo may be an added emotional link with the patient (20).

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[1] Department of Psychiatry and Neurology, New York University College of Medicine, New York City. This study was undertaken while at the Massachusetts Mental Health Center, Boston Psychopathic Hospital, and Harvard Medical School.

CONTRA-INDICATIONS

Placebos should never be given on demand (14, 77), continued for a long time (14, 20), at least without regular re-examination (18), in the belief that it is scientific (14), or given unless the indications are more carefully examined than if a specific therapy were ordered (18, 20, 46, 54).

Placebos should never be given if the diagnosis is in doubt (19, 46, 77), if the doctor-patient relationship is in jeopardy (19, 38), for retaining the confidence of those expecting but not requiring treatment (54, 77), and unless the doctor believes it will help (54).

Placebos should not be prescribed for neurotic patients whose complaints are based on anxiety and fear of disease (18), as a substitute for psychotherapy (1, 19), or for patients receiving secondary gain from their illness (38).

ARGUMENTS FAVORING THE USE OF PLACEBOS

The patient expects it, has faith in it and it makes him feel better. It is harmless and easily supplied. If the doctor refused it, the patient might feel that he does not care or was uninterested, and refusal may be calamitous (35, 77). For the busy and harried practitioner (38) it is quicker to give it than to refuse it (35). The giving of placebos is not deceit, although it may be deception, which is supported by Hippocrates (33, 46).

Its intelligent use can be of great help (14, 54). It is not whether the physician should or should not use placebos, but how he should best utilize this omnipresent effect. His need for justification for exploiting placebo action is obviated since he inevitably applies it whenever treating a patient, whether he seeks to do so or not. The practice is moral and consistent with the best medicine (54).

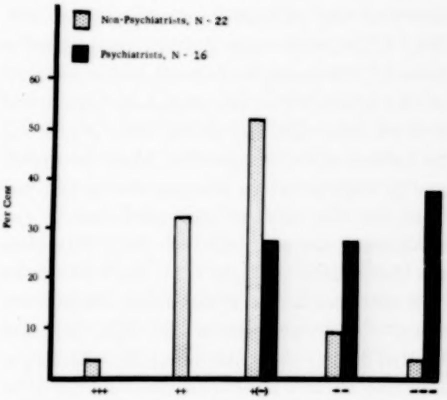

FIG. 1.: Attitudes of psychiatric and non-psychiatric physicians toward the use of placebos.

+++ Unqualifiedly for the use of placebos
++ Almost unqualifiedly for the use of placebos
+(−) For the use of placebos in general but with various reservations
−− Almost unqualifiedly against the use of placebos
−−− Unqualifiedly against the use of placebos

There was no attempt (or practical possibility) of covering this literature completely. These attitudes were derived from an extensive bibliography on the placebo. The non-psychiatric literature was surveyed more randomly and incompletely than the psychiatric literature, since, in addition to the bibliographic references, most of the available articles, texts and books in psychiatry were consulted. Many arbitrary decisions were made in the dichotomization of these attitudes, and although such a list by another would differ in detail, it is felt that the same general trends would be apparent.

ARGUMENTS AGAINST THE USE OF PLACEBOS

Every placebo is a lie, and in the long run it is found out, placebo-giving being quackery (13), a form of deceit, initially of the patient and ultimately of the doctor, a deception and a betrayal of trust (35). Many patients recognize the deception and lose faith in the doctor and it weakens the confidence of the patient in the physician (18, 35). Ultimately the doctor may deceive himself, becoming convinced of the efficacy of the drugs which he originally prescribed as a placebo (20, 35, 42, 54). For a placebo to work, positive suggestion must be added, and it may result in antagonism of the patient for the doctor and medicine if the symptoms are not relieved (38). Placebos are inadequate therapy (35), their use being in inverse ratio to the combined intelligence of the patient and doctor (35, 42), time and fear of losing patients being the chief reasons for their widespread use (35). A placebo serves the doctor's need, because he needs it for his own reassurance when hearing or understanding is not acute enough, or if the patient arouses guilt or anxiety within the doctor (15).

Placebos may establish symptoms, cause a greater demand for medication (18), produce neurosis (35), confirm deep fears which are masked by trivial complaints (35), and it may be more economical, honest and efficient in the long run to apply pure psychotherapy (22).

OTHER COMMENTS

Although the placebo effect increases with the expense of the medication (5), placebos should be inexpensive (14, 22), non-toxic (20), and inert (19, 46, 59). They should have no pharmacologic activity so as to avoid the danger of the physician deceiving himself that the preparation works (20, 33, 35, 60). On the other hand, some feel that placebos should not be inert but should be adulterated having some subjective effects which will facilitate its effect (18, 22). These opposing ideas (of whether to prescribe inert or adulterated placebos) are bridged by the view that the important and essential element is the feeling of the physician of how he can best communicate assurance to the patient, providing he establishes in his own mind the questionable merit of the drug he is prescribing (42). The prescription of placebos should be the secret only of the physician (1, 22, 44, 46, 54, 59).

ATTITUDE OF PSYCHIATRIC PHYSICIANS TO PLACEBOS

While most of the non-psychiatric physicians are in favor of using placebos, most of the psychiatrists who have (been found to have) commented on the placebo are not in favor of their use (Figure 1). Some psychiatrists favor their use in general but with various qualifications, considerations or cautions (26, 36, 50, 79, 85). Most, however, are either unqualifiedly against (16, 21, 69, 70, 76, 83), or almost unqualifiedly against their use (43, 55, 62, 65, 80).

THOSE FAVORING THE USE OF PLACEBOS IN GENERAL BUT WITH RESERVATIONS

Levine in **1942** directed his attention to the general practitioner and medical specialist in *Psychiatry in Medical Practice* (50). Although he criticized the too routine use of placebos by many practitioners, he added that it "... is one which occasionally can be useful.... (and) ... patients with psychiatric symptoms occasionally can be helped by medicine as psychotherapy." In "... cases in which the patients do not permit us to remove the source, and still other cases in which we cannot remove the source, it is a legitimate procedure to give the patient medication, which has a pharmacologic effect and in addition has a psychologic effect." He recommended that an inert substance not be given because of the likelihood of discovery and the harmful consequence to the doctor-patient relationship. This treatment is not a "deep-going treatment" and "does not remove the source of the difficulty in any way." Although there is a danger of the patient becoming addicted to and dependent on the medication he may be weaned after the beneficial effects have been achieved. In the chapter on "Suggestion Therapy," which includes the placebo as one type of such therapy, the placebo was thought to be legitimate and worthwhile in certain acute conditions to help the patient over a difficult situation, or to get rid of some disturbing symptoms. Less acute conditions, anxiety depression and hysterical symptoms may be helped. Objections to any suggestive therapy, which include placebos, are numerous. There is an element of trickery. You do not appeal to the intelligence or maturity of the patient but to neurotic and infantile attitudes and it is contra-indicated in those cases in which there is a practical possibility or availability of a more thoroughgoing etiologic or insight method of therapy. Suggestive therapy is likely to be quite temporary and to become less effective when repeated. The patient may discover the truth and distort the intentions of the physician. This may shape the patient's ideas about physicians and medicine in general and lead to the patient falling "into the hands of other types of practitioners who may be much less trustworthy than are doctors." Levine emphasized that physicians should not delude themselves about the efficacy of such therapy, or that there is no element of untruth in it, and "may come to peace with his own conscience," by the realization that these methods are used to help rather than to hurt the patient. Levine also recognized and strongly recommended the use of placebos as a control in clinical research, which is noteworthy in 1942. (He also briefly discussed some of the factors thought to underly suggestibility which will not be mentioned here.)

Whitehorn, in a medical text published in 1951 (**84**), says, "Placebo medication has a legitimate diagnostic purpose, but the use of placebos as a regular therapy is of dubious propriety and is unjustified when good psychotherapy is available. Generous provision of vitamins is empirically and rationally justified even when no specific deficiency state is clinically demonstrable." Later, in the American Journal of Psychiatry (**85**) in **1958**, he further discusses the placebo and its effects. He believes that the physician's ability to relieve the emotional, reactive aspects of a patient's illness through symbolic operations is related to the potentiation and reinforcement of the patient's expectations. These vary widely among patients depending on a number of factors, but which also include the physician's personality, behavior and his own expectations as to what he can accomplish. He criticizes physicians for the use of placebos for their own convenience and advantage rather than for the patient's welfare, and for any neglect of necessary diagnostic studies. He points out how, "Some of the implications of the physician's shame or defensiveness in using a placebo may be unfairly projected upon a patient who responds favorably to it," a favorable response in the patient often being a favorable prognostic sign. Despite the placebo's potent therapeutic powers, because of the danger that the patient will believe his illness to have a somatic base and divert him from the primary task of resolving psychological difficulties, and because the widespread use of placebos involves deceit which would destroy the faith without which they are ineffective, due to the undermining of the mutual confidence of patient and doctor, its use must be strictly limited to maintain its effectiveness.

Although many of the non-psychiatric physicians and several psychiatrists refer to "countertransference-like phenomena" as an important factor in understanding the use of placebos and the placebo effect itself, none have explored this as thoroughly as Hofling. In addition, his is the first article to cover this area specifically related to the placebo, having been published in the American Academy of General Practice in 1955 (**36**). Several factors are listed as influencing the effectiveness of placebos—the patient's underlying character structure, the quality and degree of his emotional needs at the time, including his feelings toward the doctor, and on emotional elements in the doctor. Hofling points out, "... that placebos are, as a rule, used only in situations in which the physician's knowledge (or medical knowledge in general) is inadequate to the presenting problem. Thus the use of placebos and even an open discussion of this constitutes something of a threat to the doctor's self-esteem," feelings about this being difficult to handle because they "... are often at the periphery of consciousness." In this regard, three times as many physicians interrogated by Hofling about placebos were of the opinion that they used placebos less frequently than their colleagues. He points out how the physician's feeling about the use of placebos is of great significance. "If uneasiness, embarrassment, shame, guilt or lowered self-esteem are among them, the desired effect will almost inevitably be hindered." As an example he points to the doctor whose definition of placebo was "medication without indication" and who found it extremely difficult to think of instances in which a placebo had worked for him. He attributes the favorable results of medication, which in reality were later shown to be helpful largely through its placebo effect; to the sincerity of the physician. Similarly, when the physician is quite aware of using a placebo, and freely chooses to do so and his emotional response to the patient "... is interested, warm and particularly if it is inwardly calm and relaxed (*i.e.*, unthreatened) the possibilities for the effective use of placebo-type therapeutic measures, when actually called for, are good." Placebos are frequently "... ordered in a negative or even a hostile frame of mind ... ... (usually in mild form and often unrecognized) ... arising ... from the physician's having become professionally and personally frustrated because of his inability to help the patient and because of the frequently demanding characteristics of these patients." This results in the unfortunate situation that placebos are often given during periods when the doctor-patient relationship is already in jeopardy. "The remedy," states Hofling, "is for the physician to use a placebo only when he feels sure in his own mind that it is truly in the patient's interest for him to do so, and when he has recognized and adequately dealt with whatever interfering feelings may have arisen within himself."

Hofling lists the therapeutic indications as follows: "Placebos are indicated when therapeutic measures which are 'scientifically' effective through their inherent properties are impossible or impractical of application;" they are suitable for patients "... with a chronic, nearly unmodifiable character disorder, with little or no insight and physical complaints, largely on an emotional basis." In general, they are "... indicated for those patients in whom the balance between personality difficulties (neurotic, psychotic or somatic with neurotic defences) and maturation for (or the possibility of) more definitive therapy is unfavorable." In many such instances psychotherapy would be the more definitive therapy. Placebos should not be used as a substitute for correct diagnosis, or as a diagnostic device because of the danger that truly organic symptoms may respond to the placebo and be overlooked until too late. Occasionally it may be used when the degree of suggestibility is a diagnostic point in question, and as a control in research. Hofling points to the impossibility of generalizing about what constitutes a good placebo because of the variables in the patient and the doctor. He does feel that the patient will not benefit from a placebo if he suspects its true nature, which stems to some extent from the patient's intuitive perception of the feelings in the doctor previously mentioned.

Fisher and Dlin (26) remark that, "Placebo therapy should not be discarded in general practice. It only needs to be put in its place. If, while the patient is being prepared to accept psychotherapy, medication seems necessary, a placebo may be given." Discussion of psychological problems during this period is suggested. Insight therapy, however, is felt to be the only procedure that will stand the test of time. Placebo therapy should be "... time-limited to periods of increased stress ..., the confidential secret of the therapist," and it should contain a substance with some pharmacologic action so that should the patient become suspicious, "... the therapist need only give an honest evasion rather than a lie." The positive or negative effects of placebos are thought to be the result of the emotional relationship with the doctor. Although Fisher's study indicated that most patients do not need a placebo to facilitate the doctor-patient relationship, and although it complicated and made the psychotherapy more difficult in most cases, in some instances the pill did seem to help. Fisher hopes "... that future study might indicate those patients in whom a placebo would be beneficial and that the psychodynamic problems presented by the pill's presence would not be a burden detrimental to insight," and although, "Specific indications for placebo therapy are not yet available ... placebo therapy should be an adjuvant to psychotherapy."

Thorner, in *Psychiatry and General Practice* (**79**), feels that inert medication "... is certainly justified in many instances, particularly if the psychiatric situation is of relatively minor importance and short duration. In the case of the more deeply rooted and long lasting psychiatric disturbances, the cultural beliefs of the patient in the efficacy of medicine may be submerged in a resurgence of psychiatric symptoms after the initial impetus of the placebo has subsided. This is particularly true in the use of patients with a long history of anxiety symptoms."

THOSE ALMOST UNQUALIFIEDLY AGAINST THE USE OF PLACEBOS

Although Romano (**65**), at a conference on psychotherapy for general practitioners, says, "I think it is possible to use drugs wisely, so long as you are honest about it and know what you are doing," he adds that, "By and large, it's been my experience that it is unwise to use placebos, that eventually the patients find out they've been tricked and the doctor-patient relationship may then be shattered."

Kraines (**43**) says that, "There are some psychoneurotic patients to whom placebos must be temporarily given, so accustomed are they to regulating their lives by 'pill time', until the physician has established enough personality change so that the patient realizes that he himself and not medication will solve his problem. At best placebos are temporary in effect, and the patient sooner or later fails to obtain relief. Generally much better results can be obtained if during the first few interviews the physician spends sufficient time to establish the real basis of emotional disturbance, for then he need not temporize with palliative measures but can direct this suggestion along constructive lines."

Rennie (**62**) states that although the placebo can work miracles, it "... has no place in psychiatry." This statement is tempered by his adding that suggestion is apt to be brief-lived in its effect and is only a temporary measure to carry over while more effective psychotherapy is pursued.

Tibbetts and Hawkins (**80**) state, "Whether or not the placebo has a place in psychiatric treatment, it is certain that its use in an uncritical manner cannot be justified. Used in that spirit, it could make for laxity of diagnosis, a static approach to treatment and general stultification of effort."

Masserman (**55**) comments on the use of placebos being a common procedure which has definite drawbacks, *e.g.*, a placebo is not inactive and can have adverse effects, the patient may discover or be told of the deception "... and never quite trust the physician again.... For such reasons, if it appears necessary to prescribe some intrinsically inactive medication, a dilute vitamin preparation or an inorganic iron and liver combination may be used and truthfully justified later as 'only a mild tonic.' "

THOSE UNQUALIFIEDLY AGAINST THE USE OF PLACEBOS

Although Diethelm (16) does not mention the word placebo specifically in a discussion of suggestion and hypnosis, he briefly discusses "indirect suggestion" or the giving of medicine for its placebo effect by internists, surgeons and general practitioners. He says, "Indirect suggestions which are offered in this hidden form should be avoided. They have no place in modern psychotherapy. Instead of misleading the patient, the physician ought to offer a frank formulation of his findings and encourage the patient to discuss his problems. The main indication for suggestive treatment, other than the placebo "... is the presence of symptoms which are not based on a marked personality involvement and which "therefore frequently persist after the main factors have become clear to the patient." He cautions against excessive enthusiasm for therapeutic results which may derive from this suggestive influence.

English (21) says that pills, powder, etc. (and presumably the placebo as well) vitiate the effectiveness of psychotherapy which should be applied to the exclusion of all other therapies. In those cases in which "... structural and emotional changes are present in a complicated way..." the patient should be managed by two physicians —one treating the organic disease and the other the psychic.

Weiss and English (83) point out that, "The most frequent method of psychotherapy is the giving of placebos." The physician implies that the medicine has great value, the patient feeling it is a potent drug and is sometimes relieved of symptoms. It is at least a recognition that the patient is suffering, which the patient appreciates, and probably, in many instances, gets well out of gratitude to the physician for the recognition. They advise "... correct diagnosis of psychogenic illness and the adoption of an expressive type of psychotherapy rather than a suppressive one."

Salifield (70) decries the use of placebos in psychiatry. He feels that it is wrong according to all principles of psychotherapy to give a placebo to psychoneurotic patients because it makes psychotherapy difficult or almost impossible if the patient becomes convinced that there is some medically treatable condition and will not accept the psychogenic basis of his disorder. Whenever palliative and drug treatment is felt to be indicated in psychosomatic illnesses and syndromes such as "vegetative imbalance" or "concomitant emaciation," it requires full explanation to the patient as to what is intended to produce or effect.

Sadler (69) states, "As a general rule psychiatrists do not look with favor upon the use of placebos." He acknowledges the effect of placebos but feels it "is simply 'begging the question' as regards the final cure...," that it is dishonest and unscientific..., and prefers the educational approach to the problem of neuroticism even though it requires much more time... because the results produced by placebos are always transient and illusory.

The routine use of placebos in psychiatric centers must be rare if used at all. According to Dr. Harry C. Solomon, placebos have never been sanctioned or used at the Massachusetts Mental Health Center, Boston Psychopathic Hospital, except as controls in research (76).

DISCUSSION

It is clear from the aforegoing data that there are many different attitudes toward the use of placebos in treatment. Non-psychiatric physicians tend to hold views different from psychiatric physicians, and both groups differ widely among themselves. These differences of opinion may reach vitriolic intensity (54). The factors responsible for these disparate opinions are complex. They would include: semantic differences, dissimilar demands of reality, diverse theoretical orientations, ethical and philosophic values and the personalities and unconscious conflicts of both the patient and the physician.

An important source of these differences of opinion is related to the different definitions of the placebo, conceptions about what constitutes the placebo effect and beliefs about which therapies are effective independent of the placebo effect.

Some limit the definition of the placebo to non-active (inert) medication, while others include active (non-inert) medication. Some limit the definition to medication (active or non-active) but only when it is given by a physician with full knowledge that a placebo is being prescribed, while others include medication which is prescribed without the physician's knowledge that it is actually inactive, non-specific and acting like a placebo. Thus, the word "placebo" can be defined as any therapeutic procedure (or that component of any therapeutic procedure) which is given to have an effect on or does have an effect on a symptom, syndrome or disease, but which is objectively without specific activity for the condition being treated. Some view any discussion of whether to use placebos as being only an academic question, since all therapeutic procedures can act as a placebo and since a placebo effect is in part a consequence of almost all medical procedures. This would include, therefore, all medical procedures no matter how specific—oral and parenteral medication, topical preparations, inhalants, mechanical procedures and surgery which may have the greatest placebo effect (in addition to the specific effect of the surgery) (54).

If the word "placebo" is limited to medication, it is possible that some of the differences between psychiatrists and non-psychiatrists is due to the fact that, in general, psychiatrists prescribe less medication of all sorts than non-psychiatrists. Perhaps non-psychiatrists utilize the placebo as treatment more often, *e.g.*, to strengthen the patient-doctor relationship, than psychiatrists who prefer to treat without capsular crutches. However, this would mean that those treatments of psychological illness that are used by psychiatrists are superior to those used by non-psychiatrists, since if the converse were true, psychiatrists would use medicine which would not then be capsular crutches. If a definition of the placebo is limited to medication, then the possibility that these therapies are acting as placebos can be avoided. Unfortunately, at the present time, it is not yet clear to what extent therapies such as psychotherapy (**3**, **24**, **28**, **30**, **31**, **32**, **39**, **51**, **52**, **56**, **66**, **71**, **72**, **75**, **85**), ECT (**8**, **12**, **40**, **67**, **86**), IST (**2**, **6**, **7**, **9**, **11**, **25**, **53**), etc. (**10**, **15**, **16**, **45**, **50**, **78**, **80**), act independently of the placebo effect. Other papers illustrating the unresolved status of drugs in psychiatry are too numerous to mention. Since there is at the present time no conclusive evidence that the effectiveness of these therapies are not due to the same factors operating in the effectiveness of placebos, this possibility must be entertained.

The important essence underlying the use of the word "placebo" is not the definition but whether the source of a therapy's effectiveness is the same as that of the effectiveness of a placebo. If the definition is broadened to what is believed to be the more adequate definition described previously, this question cannot be avoided and the definition has important heuristic value.

A tendency is noted for psychiatrists to discuss the placebo more readily when addressing non-psychiatric physicians than when addressing their colleagues. Of all the cited attitudes toward placebos by psychiatrists, more than one-half have appeared in nonpsychiatric media (**21**, **26**, **36**, **50**, **62**, **65**, **70**, **79**, **84**). It appears that the widespread use of placebos among non-psychiatrists cannot be ignored. The tendency to avoid discussion of the placebo in psychiatric literature may indicate that psychiatrists do not use (or feel that they do not use) placebos in their practices. It would be of interest to explore the attitudes and expectations of various medical specialties toward the use of placebos in their own practices and their expectations of the placebos' use among other medical specialties. A hint at the result is given by Hofling (36) who found three times as many of the physicians interrogated about placebos were of the opinion that they used placebos less frequently than their colleagues. It may indicate that psychiatrists sanction their use in other specialties but not in their own specialty.

The disinclination to use (or advocate the use of) placebos in psychiatry is reflected in the attitude toward their use during psychotherapy. This attitude cuts across the three dichotomies of "for use in general but with reservations" (26, 36, 50), "unqualifiedly against" (16, 21, 70, 83) or "almost unqualifiedly against their use" (43, 62). Most feel that when "good psychotherapy is available or practical", a placebo is not indicated. The giving of placebos (or even medication) during psychotherapy may be viewed as compromising some major psychotherapeutic principles. It involves the substitution of activity for verbalization. It dissipates anxiety on the part of both the physician and the patient (*doing* by the therapist, *taking* by the patient). It may encourage *acting-out* rather than *talking-out*. Anxiety symptoms may be diverted into useless channels, making them unavailable for psychotherapeutic understanding and *working-through*, as well as decreasing the motivation for understanding and psychotherapy. Its effects can be deleterious if it confirms fantasied fears and forbidden wishes of the patient. On the other hand, in recent years, some writers have speculated that a decrease in anxiety produced by pharmacologic (or placebo) means can facilitate psychotherapy (26, 27, 29, 30, 47, 48, 49, 58, 68). Despite these speculations, it has not been demonstrated that placebos or even active pharmacologic agents are ever necessary during psychotherapy or are more efficacious than psychological techniques used alone. Whether brief psychotherapy is a feasible and superior alternative to placebo therapy is also not yet known (24, 30, 31, 66). Another question requiring clarification is whether the giving of placebos at the beginning of an acute illness (as well as the use of drugs, ECT, ICT, lobotomy, etc.) instead of psychotherapy might interfere with the maximal benefit possible in any psychotherapeutic treatment used later. The answers to these questions, and many others that could be raised are limited by the present state of medical knowledge and will require considerable research before being clarified.

An ideal situation would be one in which all symptoms, syndromes, diseases and their therapies were completely understood, in which time, finances and personnel necessary for this were available, and in which no question of "deceit or deception" could be raised. Obviously, this is an idealistic position. It ignores the limitations imposed by reality and practically, *e.g.*, the number of available psychiatrists (9,295) compared to the estimated number of individuals requiring treatment (16 million) (57) in a setting of widely differing social and cultural conditions (37). If all these people were to require treatment by psychiatrists who worked forty hours per week, the time alloted to each would be about one hour per year. If one hour per week were deemed necessary it would require 500,000 psychiatrists, an increase in the number of psychiatrists by 5000 per cent, or more than twice the total number of physicians in the United States.

An idealistic position also ignores the plight of the over-burdened general practitioner and even physicians in internal medicine, fifty to eighty per cent of their patients having primary functional complaints (4, 29, 41). It overlooks the merit of being able to treat many patients (somewhat successfully though possibly superficially) with a minimum of time and without incurring serious financial difficulties. If the ideal were practiced today, the vast majority of patients would not be treated at all, and would probably have to resort to various and sundry charlatans for help. Would it be justifiable for the patient and doctor, considering the realities involved, to advise intensive, extensive and expensive treatment for conditions that might respond to an inexpensive and brief procedure? It would be unrealistic to ignore some of these practicalities.

Although much could be said for both views, and although the idealistic viewpoint is at one end of a continuum, it does not follow that the ideal should not be approached, *i.e.*, rational therapy should supplant the use of placebos in treatment whenever possible. However, a completely idealistic, scientific and fully resolved answer is impossible at the present time because of the highly complicated factors involved.

Much of the material hints at or implies important ethical attitudes either stemming from or underlying the use of placebos. A discussion of the ethics of using placebos has been avoided because of the further complexity and uncertainty that this would entail. Perhaps all that should be said is to acknowledge the fact that the practice of prescribing placebos (knowingly and unknowingly) is inevitable at the present time, and is determined by the seeking of a level of use and disused based on the ebb and flow of all the factors involved. What is certain, however, is that with increasing knowledge of the factors underlying placebo action in particular and the therapeutic process in general, such ethical considerations will diminish in importance or at least be clarified (61, **73**, **74**).

SUMMARY

A review of the attitudes about the indications, contraindications and arguments for and against the use of placebos as a therapeutic measure has been presented. Striking differences are noted between the attitudes of psychiatric and non-psychiatric physicians. Non-psychiatric physicians tend to favor, advocate and sanction the use of placebos. Psychiatrists markedly oppose, criticize and condemn their use. Both groups differ widely among themselves. Questions involved in the use of placebos are highly complex and no simple or universal answer is available. It is concluded that the only realistic position at the present time lies in the continued scientific investigation of the factors underlying the use and effect of placebos.

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A COMPARISON OF THE EFFECTS OF MEPROBAMATE, PHENOBARBITAL AND *d*-AMPHETAMINE ON TWO PSYCHOLOGICAL TESTS[1]

ARTHUR M. TOWNSEND, III, M.S.[2] AND ALLAN F. MIRSKY, PH.D.[3]

Several studies (5, 6, 8) have shown that chlorpromazine and secobarbital produce impairment on the Continuous Performance Test (C.P.T.) (10), a procedure designed to measure sustained attentiveness or vigilance, and on the Digit Symbol Substitution Test (D.S.S.T.) (13), one of the component subtests of the Wechsler Adult Intelligence Scale. These studies indicated, however, that chlorpromazine produced greater impairment on the C.P.T. than on the D.S.S.T., and that the reverse was true for secobarbital. This differential effect on the performance of the two tests suggested that they might be used to provide a behavioral method for distinguishing between the effects of tranquilizing and barbiturate drugs. Thus, if all tranquilizers have similar effects on these tests, irrespective of the marked differences in their physiological effects, then meprobamate (like chlorpromazine) should impair the C.P.T. more than the D.S.S.T. Similarly, if all barbiturates have a common effect on these tests, then phenobarbital (like secobarbital) should impair the D.S.S.T. more than the C.P.T. The primary purpose of this investigation was to test these two propositions by administering meprobamate and phenobarbital to normal persons and measuring the effects on the C.P.T. and the D.S.S.T. In addition, the effects on these two tests of the stimulant drug *d*-amphetamine were investigated to provide information which might aid in the interpretation of the differential impairment produced by the depressant tranquilizers and barbiturates.

EXPERIMENT 1: METHOD

Subjects. Eight normal individuals, five male and three female, whose mean age was 20.9 years (range 18–22 years) and whose mean Wechsler-Bellevue Full Scale IQ was 119.6 (range normal-superior) served as *Ss*. These *Ss*, as well as those in the second experiment, were healthy individuals who, in accordance with their religious beliefs, had volunteered to participate in medical research studies. During the investigation, they were maintained as inpatients in the Clinical Center of the National Institutes of Health.

Tests: The C.P.T. The C.P.T. consists of the *X* and *AX* tasks. In each task, letters mounted on an endless-belt filmstrip are presented to *S* for 0.2 second at the rate of about one per second. In the *X* task, which is always presented first, *S* is required to press a response key whenever he sees the letter X appear in the series. In the *AX* task, *S* is required to press the key only if the letter X follows immediately after the letter A. A ten-minute record of *S*'s performance on each task is scored in two ways: 1) the relative score, defined as the number of correct responses divided by the sum of the correct and incorrect responses the *S* has made, and 2) the absolute score, defined as the number of correct responses divided by the total number of correct responses possible. The total number of correct responses possible on the *X* and *AX* tasks are 160 and 120, respectively. Thus, each *S*'s record is analyzed in terms of four measures: *X*-Relative (X-R), *X*-Absolute (X-A), *AX*-Relative (AX-R) and *AX*-Absolute (AX-A). These measures are converted to percentages by multiplying the obtained fractions by 100.

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[2] School of Medicine, Howard University, Washington, D. C.

[3] Laboratory of Psychology, National Institute of Mental Health, Bethesda, Maryland.

The D.S.S.T. The D.S.S.T. is similar to that used in the Wechsler Adult Intelligence Scale, except that spaces are provided for 140 symbol substitutions instead of the 67 contained in the usual form of the test. This provides a test that no *S* can complete, even with practice, in the 90 second time limit. To control for the effects of learning a specific code, a different digit symbol key (*i.e.*, a different pairing of numbers and symbols) was presented to the *S*s on each test day. *S*'s score was the number of symbols correctly copied during the 90-second time limit.

Procedure and Design. *S*s were tested first on the C.P.T. and then on the D.S.S.T. approximately two hours and fifteen minutes after drug administration. The *S*s would thus have taken the D.S.S.T. approximately 160 minutes after receiving the drug.

Treatments. The experimental treatments consisted of two dose levels of meprobamate (800 and 1600 mg.), two of phenobarbital (60 and 120 mg.), two of d-amphetamine sulfate (5 and 15 mg.) and two placebo treatments. Each *S* was administered each of the eight treatments orally in identical gelatin capsules according to an 8 x 8 latin square. The latin square was designed so that each of the eight treatments preceded and followed every other treatment only once, thus minimizing any systematic effect which might have resulted if one treatment consistently followed another. Neither the *S*s nor the *E*s knew which of the eight treatments had been given on any test day. At least 48 hours separated each drug administration.

RESULTS

Table 1 presents the mean values of the C.P.T. scores and of the D.S.S.T. scores for each of the treatments in Experiment 1. The differences between the several treatments and the combined placebo were evaluated by means of the Dunnett (3) t test, which revealed that only the high dose (1600 mg.) of meprobamate produced significant impairment on these tests. The measures which showed significant impairment were D.S.S.T. ($p < .01$) and X-R and X-A ($p < .05$). The impairment on the AX-A measure approached but did not reach statistical significance ($p = .10$). Neither phenobarbital nor d-amphetamine produced any significant change in the scores.

To compare the relative amounts of impairment produced by the 1600 mg. dose of meprobamate on the D.S.S.T. and the C.P.T., *Impairment Percentages* (100 × the

TABLE 1

Mean C.P.T. Percentage Correct Scores and D.S.S.T. Correct Scores for Placebo and Drug Conditions, Experiment 1.

Measure	Mean Placebo	Meprobamate		Phenobarbital		d-Amphetamine	
		1600 mg.	800 mg.	120 mg.	60 mg.	15 mg.	5 mg.
X-R	98.865	93.98*	97.96	97.50	98.44	99.22	98.75
X-A	98.67	92.11*	97.73	97.42	98.44	99.06	98.75
AX-R	98.06	97.00	98.12	98.12	97.97	98.74	98.41
AX-A	97.60	94.06	96.77	95.83	96.98	98.02	97.50
Digit symbol	64.19	56.38†	62.88	63.25	61.50	65.38	62.30

* Differs from mean placebo at $p < 0.05$, 1-tailed Dunnett t test.

† Differs from mean placebo at $p < 0.01$, 1-tailed Dunnett t test.

difference between the number of correct responses on placebo and the number of correct responses on 1600 mg. of meprobamate, divided by the number of correct responses on placebo) were computed for each subject on the *X* and *AX* tasks of the C.P.T. and on the D.S.S.T. The average Impairment Percentage for the eight *S*s on the *X* task was 7.00, on the *AX* task, 3.32, and on the D.S.S.T., 14.87. There was no significant difference between the percentages of impairment on *X* and *AX* ($p > .10$). The difference between the *AX* and D.S.S.T. percentages was significant at $p < .05$; although the difference between the *X* and D.S.S.T. percentages was in the same direction, it did not reach statistical significance ($p > .10$). These comparisons suggest that the D.S.S.T. was more sensitive to the effect of the 1600 mg. dose of meprobamate than was the C.P.T.

EXPERIMENT 2: METHOD

The results of Experiment 1 indicated that phenobarbital was without significant effect on the C.P.T. or the D.S.S.T. In a previous experiment (8), the effect of another barbiturate, secobarbital, on the C.P.T. was manifested between 30 and 75 minutes post drug administration, but at no other time. To check on the possibility that the significant effect of phenobarbital had been missed in Experiment 1, ten *S*s similar to the population used in Experiment 1, were tested on the D.S.S.T. and on the *AX* task of the C.P.T. and then were administered orally 120 mg. of phenobarbital. The two tests were repeated seven times during consecutive 25 minute periods postdrug. The period of time covered thus extended from about 10 minutes predrug to 165 minutes postdrug. The *AX* task was employed in this experiment because the results of Experiment 1 (Table 1) suggested that there was a somewhat greater (although statistically insignificant) effect of 120 mg. of phenobarbital on the AX-A measure than on any of the other C.P.T. measures; also, the previous study of the effects of secobarbital (8) suggested that the *AX* task was more sensitive to the effects of the barbiturate than the *X* task.

TABLE 2

Mean AX-Relative, AX-Absolute and D.S.S.T. Number Correct Scores Before and After Administration of 120 mg of Phenobarbital, Experiment 2.

Successive Tests	Scores		
	Mean AX-R	Mean AX-A	Mean D.S.S.T.
Pre-Drug	96.0	93.9	79.2
1 (5′–25′)	96.9	95.5	77.1
2 (30′–50′)	96.6	95.6	77.7
3 (55′–75′)	97.5	96.9	73.0*
4 (80′–100′)	96.0	95.6	76.4
5 (105′–125′)	96.6	95.2	76.4
6 (130′–150′)	94.1	93.6	74.2*
7 (155′–175′)	92.4	93.4	75.7†

* Differs significantly from pre-drug test at $p < 0.05$ (one-tailed test).

† Based on N = 8; all other means, N = 10.

RESULTS

Table 2 presents the mean AX-R, AX-A and D.S.S.T. (number correct) scores for the predrug test and for the seven postdrug tests. There was no significant impairment in performance of the AX task at any time following drug administration. There was, however, a small but significant impairment in performance of the D.S.S.T. at the third and sixth postdrug tests, as evaluated with the Dunnett *t* test. No significant decrement was detectable at the seventh postdrug test (155 to 175 minutes post administration), which is consistent with the results of Experiment 1. In the latter case, the effect of the several drugs on the D.S.S.T. was measured at approximately 160 minutes postadministration.

DISCUSSION

The results of the second experiment indicate that phenobarbital produced significant impairment in the performance of normal persons on the D.S.S.T., whereas this drug was without significant effect on the

C.P.T. The proposition that barbiturates will impair performance on the D.S.S.T. more than on the C.P.T. was therefore supported. On the other hand, the proposition that all tranquilizer drugs will impair performance on the C.P.T. more than on the D.S.S.T. was not supported. Meprobamate, in contrast with chlorpromazine, did not produce this effect; on the contrary, acting like a barbiturate, **1600** mg. of this drug produced at least twice as much impairment on the D.S.S.T. as on the C.P.T. (Experiment 1). No information which would aid in an interpretation of these effects was provided by the administration of *d*-amphetamine, no significant effect of this drug being observed on either test.

The *S*s in Experiment 2 tended to perform better on the D.S.S.T. in the nondrug condition than the *S*s in Experiment 1. However, since no direct comparison was made across experiments between amounts of impairment on this test, the differences in initial levels will be ignored for the purposes of this discussion.

The behavioral effects of the tranquilizers chlorpromazine and meprobamate differ, at least as measured by these tests. To maintain that these tests are useful in differentiating the effects of the barbiturates and the tranquilizers requires explanation of the fact that by this method meprobamate resembles more the barbiturates secobarbital and phenobarbital than the tranquilizer chlorpromazine. A possible explanation may be found in the differences in the physiological effects of meprobamate and chlorpromazine. Chlorpromazine slows the frequency of the brain waves (**12**). Meprobamate, on the other hand, increases the frequency of the brain waves (**4, 9, 11**). The similarity of this effect to that which follows barbiturate administration has been noted repeatedly (**4, 9, 11**). If agents which increase the frequency of the E.E.G. share a common effect on the brain, which differs from that reflected in slowing of the E.E.G., then it would be expected that the behavioral effects of meprobamate would resemble those of the barbiturates rather than those of chlorpromazine. The effects of meprobamate on the E.E.G., as well as other findings, led Pfeiffer *et al.* to conclude, "... meprobamate is not an ataractic drug such as chlorpromazine ... it can be classified as a barbiturate-like drug ... " (**9**, p. **743**). The present results are compatible with those of Pfeiffer.

Thus, the present result that the effects of meprobamate on the D.S.S.T. and the C.P.T. resemble more the effects of the barbiturates than chlorpromazine might be attributed to the fact that in its physiological effects meprobamate resembles more a barbiturate than chlorpromazine. The proposition that all tranquilizers will affect the D.S.S.T. and C.P.T. in a different manner than will barbiturates was not supported. The hypothesis which is now suggested is that agents (such as chlorpromazine) which slow the E.E.G. will impair the C.P.T. more than the D.S.S.T., whereas those which increase the frequency of the E.E.G. (barbiturates, meprobamate) have the reverse effect.

Some additional support for this suggested relation between behavior and the E.E.G. is provided by a study of the effects of prolonged sleep loss. This procedure, which like chlorpromazine produces slowing of the E.E.G. (**1, 2**) also produces more than twice as much impairment on the C.P.T. as on the D.S.S.T. (**7**).

These considerations suggest, therefore, that the physiological effects of the centrally-acting drugs may provide a better means of classifying them and of understanding their effects on behavior than the fact that they may have similar clinical applications. Further experimentation with other drugs (and other agents) which have an effect upon the E.E.G. will be necessary to establish the generalizability of the psychophysiological relationship which has been suggested here.

SUMMARY

1. Two experiments were conducted to measure the effects of meprobamate, phenobarbital and *d*-amphetamine upon the Continuous Performance Test (C.P.T.) and the Digit Symbol Substitution Test (D.S.S.T.), and to compare these effects with those produced by chlorpromazine and secobarbital, which were measured in previous studies.

2. Like secobarbital, phenobarbital produces more impairment on the D.S.S.T. than on the C.P.T.; there was, in fact, no significant effect of phenobarbital on the C.P.T. Unlike chlorpromazine, however, meprobamate did not impair performance of the C.P.T. more than that of the D.S.S.T.; as in the case of the two barbiturates, it produced more impairment on the D.S.S.T. than on the C.P.T.

3. The difference between these behavioral effects of chlorpromazine and meprobamate may relate to the fact that their effects upon the E.E.G. differ: chlorpromazine slows the brain wave frequencies, while meprobamate, like the barbiturates, increases the brain wave frequencies.

4. It was suggested that the physiological effects of centrally-acting drugs may provide a better means of understanding their effects on behavior than the fact that they may have similar clinical applications.

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PHYSIOLOGICAL REACTIONS AND PSYCHIATRIC PROGNOSIS

JOHN B. MARKS, PH.D.,[1] JAMES C. STAUFFACHER, PH.D.,[1] LEON S. DIAMOND, M.D.[1] AND ALBERT F. AX, PH.D.[2]

The observation that psychotic patients differ physiologically from normal subjects has been demonstrated in a number of studies. It has also been shown that psychotic patients vary widely among themselves in physiological functions. The behavioral correlates of the variability among psychotics have still to be shown.

Funkenstein and his associates have developed theory to explain the meaning of these differences. This theory can be expressed in three propositions.

Proposition 1. Psychotic patients with good prognoses show a systolic blood pressure response to injections of epinephrine and of mecholyl different from the response of psychotics with poor prognoses. In general, those with good prognoses show a small or moderate response to epinephrine as compared to a moderate or great response among those with poor prognoses. In response to mecholyl the relationship is reversed, those with good prognoses showing the greater blood pressure drop (2).

Proposition 2. These blood pressure response differences parallel the differences in response of normal individuals who have previously received injections of epinephrine and nor-epinephrine. Therefore it can be said that psychotics with good prognoses have physiological responses similar to persons with high blood epinephrine levels while those with poor prognoses resemble persons with high blood nor-epinephrine (3).

Proposition 3. There are behavioral correlates of these epinephrine-like and nor-epinephrine-like patterns. Specifically, psychotics with epinephrine-like patterns and hypothesized good prognosis will be characterized by an inwardly directed anger in response to stress and by depression. Psychotics with nor-epinephrine-like patterns (and therefore hypothesized poor prognosis) will be characterized by outwardly directed anger after stress and by hostile, paranoid behavior (4).

The present study provides a test for some of these hypotheses. It also extends the physiological measurement beyond the systolic blood pressure used in the original Funkenstein studies and adds another stress, the psychological one of cold pressor, to the injection stresses of the Funkenstein test.

SUBJECTS

The subjects were twenty-six newly admitted psychotic patients at American Lake. All but one, who showed a depressive reaction, were diagnosed as schizophrenic. Fourteen were diagnosed as paranoid schizophrenics, eight as undifferentiated, two as simple and one as a schizo-affective. All were without known organic pathology and none had received somatic treatment during the last month or were on medication at the time of testing.

PROCEDURE

The reclining subjects were allowed to reach a base level in a thirty-minute introductory rest period. They then were without warning given the cold pressor test, consisting of immersion of the entire forearm in water at 4° C. for one minute. Following a twenty-minute recovery and rest period they were then given an intravenous injection of .025 mg. epinephrine hydrochloride. This was followed by a thirty-minute recovery period. On the following day there was a second trial. Again the subjects were allowed a thirty-minute rest period which was followed by an intramuscular injection of 10 mgs. of mecholyl and another thirty-minute recovery period.

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[1] Veterans Administration Hospital, American Lake, Washington.

[2] Present address: Lafayette Clinic, Detroit, Michigan.

Physiological activity was continuously recorded through the rest, stress, and recovery periods by an improvised polygraph apparatus designed by Ax with output to four channels of a six-channel Grass EEG machine. Systolic and disastolic blood pressure were measured at one-minute intervals by the ausculatory method through all periods except for the minute following each stress when the blood pressures were recorded as quickly as they could be taken. In the minute following the epinephrine injection only systolic readings were taken so that the rapidly rising pressure could be followed more closely.

In addition to blood pressure readings the following additional variables were recorded:

1. Heart rate was recorded by EKG leads to ear lobe and ankle.

2. The acceleration imparted to the body by the surge of blood from the heart at systole was measured by an improvised ballistocardiograph. This consisted of a box strapped against the right shinbone. In the box was a crystal phonograph pickup and in place of the stylus a small brass weight was suspended. The periodic acceleration of the body moved the pickup relative to the weight inducing a voltage in the crystal which was then amplified and recorded by the EEG machine. The height of the IJ wave was used as a rough index of the relative amounts of stroke volume.

3. Respiratory rate was continuously recorded by the use of a variable resistance system. In an elastic tube which was placed around the chest was a dilute copper sulphate solution. Expansion and contraction of the chest changed the length of this tube and the resistance of the column of solution within it.

4. Skin conductance was measured every second by a small current of changing polarity which was applied to electrodes taped to the pads of the two middle fingers of the subject's left hand. The subject's resistance was balanced against an external resistance and deviations from balance could be detected by deviations of the recording pens. Two measures were derived from these conductance values—one of skin conductance as such and the other of GSR's (quick increments of conductance) within a given period.

Thus there are seven variables which are of interest: systolic and diastolic blood pressures, heart rate, ballistocardiograph measurements, respiratory rate, skin conductance, and number of GSR's within a given period. All subjects received scores on all of these variables both for the resting levels preceding the three stresses and for the increments and decrements which they showed in response to the stresses. The resting level was the mean measurement taken during the last five minutes of each resting period for blood pressure, respiration rate, and GSR rate and during the last minute for ballistocardiograph, heart rate, and skin conductance. The increment score was the highest rise above resting level in each variable during the response period (five minutes after the cold pressor and epinephrine stresses and fifteen minutes after the mecholyl). The decrement score was the greatest decline in each variable during the response period. Raw difference scores were used in increments and decrements.

Thus it will be seen that, theoretically at least, each individual could have three scores (resting level, increment, and decrement) for each of seven variables in each of three stresses. In practice, however, instrumentation difficulties sometimes prevented an individual from receiving all sixty-three scores. Individuals showing no increment (or decrement) in a given variable to a given stress were given a zero increment (or decrement) score for that stress.

Subjects were divided into epinephrine-like (E) reactors and norepinephrine-like (N) reactors in terms of their response to the psychological stress of cold pressor. Eleven of the subjects were clearly E type in that their 1) heart rate increased by at least five per cent at the time of the maximum mean blood pressure increment, 2) there was an increase of at least five per cent in the product of IJ wave and heart rate, and 3) there was no change or a decrease in the ratio of mean blood pressure to the product of IJ wave and heart rate. Seven subjects were clearly N type in that measure #1 decreased or increased only slightly, there was no change in measure #2, and measure #3 increased by at least five per cent. These criteria follow those used by Funkenstein and his associates (4, p. 66). Eight of the subjects could not be assigned with certainty to either group.

The Multidimensional Rating Scale for Psychiatric Patients (MDRSPP) was completed by a ward psychiatrist and nurse for each subject at the time of his testing. An "externalization score" was computed for every subject by summing MDRSPP factors A + B + C + D + H + J − E. High scores on the first six factors represent, respectively, "manic excitement," "resistiveness," "paranoid projection," "high activity level," "belligerence and grandiose expansiveness." A low score on the E factor represents low "melancholy self-concern." Thus, a person with a high externalization score was—in terms of these ratings—excited, resistive, paranoid, overactive, belligerent, grandiose, and unconcerned. In spite of this description this externalization is not a measure of degree of disturbance. A morbidity score was computed based upon the deviations of the subjects' ratings and those of a hypothetical "normal." The correlation between morbidity and this externalization score was only .05.

Two years following the measurements it was found that one group (H) of twelve subjects had remained hospitalized continuously since the first measurements. Another group (D) of nine subjects had been discharged and remained outside the hospital. Five subjects had been discharged but had returned. Although hospital discharge *per se* is certainly not the best criterion for improvement, it is not unreasonable to think of the D subjects as the good prognosis group, while the H subjects can be thought of as the poor prognosis group. The mean age of the D group was 33.2 while that of the H group was 32.6; this difference is not statistically significant.

ANALYSES OF RESULTS

From proposition 1 a number of hypotheses may be set up as follows:

1. The increment of systolic blood pressure to epinephrine injection will be less for D's than for H's.
2. The time taken for recovery after epinephrine from the increment to base level will be less for D's than for H's.
3. The decrement of systolic blood pressure to mecholyl injection will be greater for D's than for H's.
4. The time taken for recovery after mecholyl from the decrement to base level will be greater for D's than for H's.
5. The mecholyl area, computed by the method of Gellhorn (5), will be greater for the H group (*i.e.* they will show more frequent hypertensive reactions) than for the D group.

From proposition 2 some further hypotheses can be set up. These hypotheses are based on the heightening effect which epinephrine has upon metabolism, pulse, and cardiac stroke volume. They assume, too, that the D group is already reacting to a high blood level of epinephrine and is, therefore, in Gellhorn's terms, parasympathetically tuned, and not likely to be so reactive to the epinephrine injection:

6. The increment of diastolic blood pres-

sure to epinephrine will be less for D's than for H's.

7. The increment of heart rate to epinephrine will be less for D's than for H's.

8. The increment of ballistocardiograph IJ waves to epinephrine will be less for D's than for H's.

9. The increment of respiration rate as a consequence of heightening metabolism following epinephrine will be less for D's than for H's.

10. The decrement of diastolic blood pressure to mecholyl will be greater for D's than for H's.

TABLE 1

H and D Differences as Predicted by Hypotheses

	Mean H	Mean D	*t*	DF
1. Inc SBP to Epinephrine	52.9	49.6	0.51	19
2. Recovery time SBP after Epinephrine	5.33	5.44	0.11	19
3. Dec SBP to Mecholyl	24.7	14.1	−1.83	19
4. Recovery time SBP after Mecholyl	10.67	5.33	−1.88	19
5. Mecholyl area	−14.8	9.1	−1.13	18
6. Inc DBP to Epinephrine	6.1	4.9	−0.46	19
7. Inc HR to EP	18.5	30.1	−2.11*	19
8. Inc BCG to Epinephrine	3.7	14.1	−1.07	19
9. Inc Respiration rate to Epinephrine	4.4	5.1	−0.54	18
10. Dec DBP to Mecholyl	21.3	14.8	−1.44	19

A negative *t* indicates results in opposite direction from hypothesis.
* Significant at 0.05 level.

TABLE 2

Mean Squares, Degrees of Freedom, and F Ratios for Outcome Groups on Different Physiological Measures

	Between Groups	Within Groups	DF	F	Group Higher
Resting Level					
Systolic blood pressure	3,838.1	879.9	1/18	4.36	H
Diastolic blood pressure	3,114.5	891.5	1/18	3.49	H
Heart rate	2,986.5	351.4	1/18	8.49**	H
IJ wave	115,119	28,056	1/18	4.10	H
Respiration rate	192.3	37.7	1/17	5.10*	H
Skin conductance	152.1	255.7	1/18	0.59	
No. of GSR's	3.8	8.4	1/18	0.45	
Increment					
Systolic blood pressure	4.3	206	1/18	0.02	
Diastolic blood pressure	15.9	56.1	1/18	0.28	
Heart rate	721.7	134.7	1/18	5.35*	D
IJ wave	78.5	12.2	1/18	6.43*	D
Respiration rate	14.8	11.2	1/17	1.32	
Skin conductance	6.6	58.3	1/18	0.11	
No. of GSR's	22.0	4.2	1/18	5.23*	D
Decrement					
Systolic blood pressure	381.7	85.7	1/18	4.45*	H
Diastolic blood pressure	179.5	68.6	1/18	2.61	
Heart rate	195.1	35.9	1/18	5.43*	H
IJ wave	1.1	7.4	1/18	0.14	
Respiration rate	0.2	20.8	1/17	0.01	
Skin conductance	5.9	3.0	1/18	1.96	
No. of GSR's	0.9	2.4	1/18	0.37	

* $p < 0.05$
** $p < 0.01$

The tests of these ten hypotheses are shown in Table 1. It will be seen that none is confirmed in the predicted direction. In one instance, the increment of heart rate following epinephrine, the results go directly against the hypothesis: the discharged patients show a significantly greater increment than do those who remain hospitalized.

On the basis of proposition 3, two hypotheses were set up.

11. If the subjects are divided into epinephrine-like (E) and norepinephrine-like (N) reaction groups according to the Funkenstein formula, the N group will be expected to have higher externalization scores that the E group. In other words, we should expect the norepinephrine stress reaction to characterize those patients who are more hostile and resistive, while the epinephrine reaction might characterize those who showed a more depressed picture. The test was made and showed no externalization score differences between E and N. The respective means are **43.0** and **44.3** and the *t* is only **0.29**. It should be remembered, however, that the N group was composed of only seven individuals.

12. The H group will have higher externalization scores than will the D group. This hypothesis was confirmed. The mean externalization score for the H's is **48.0**, for the D's, **37.2**. The difference between these means is significant at the **0.05** level ($t = 2.61$ for **19** DF).

Analyses of variance were carried out for each of the seven variables on resting level, increments and decrements—twenty-one analyses in all. Subjects were divided into H and D blocks, and there were separate scores for each of the three stresses. Variance ratios can be computed between outcomes, between stresses, and between their interactions. However, it can be expected that there will be differences in responses to the three stresses (the two injection stresses have opposing effects on many of our variables) and none of the interactions were significant. Therefore, only the twenty-one outcome (H *vs.* D) ratios are shown in Table 2.

It will be seen that for all but the skin variables the H patients tend to have higher resting levels than the D patients, and for heart rate and respiration rate these differences are statistically significant.

The increments and decrements also show significant F ratios between outcome groups. However, these significant ratios probably do not give much additional information beyond that of the findings of higher resting levels for the H group. The correlations between resting level and increments and decrements shown in Table 3 show a definite tendency. In general, increments tend to be negatively correlated with resting level, while decrements are positively correlated—in agreement, essentially, with the findings of other studies (5). Thus, given an elevated resting level for the H group, they might be expected

TABLE 3

Correlations of Base Level with Increments and Decrements on Seven Variables and Three Stresses

	Inc.	N	Dec.	N
SBP CP	−0.26	21	+0.15	21
SBP EP	+0.03	21	+0.48*	21
SBP ME	−0.03	21	+0.34	21
DBP CD	−0.19	21	+0.48*	21
DBP EF	+0.16	21	−0.04	21
DBP ME	+0.21	21	+0.68**	21
HR CP	+0.25	21	+0.37	21
HR EP	−0.24	21	+0.33	21
HR ME	−0.42*	21	+0.27	21
BC CP	+0.16	21	+0.004	21
BC EP	−0.03	21	−0.12	21
BC ME	−0.20	20	+0.09	20
RR CP	−0.48*	20	−0.09	20
RR EP	−0.11	20	+0.21	20
RR ME	−0.51*	20	+0.52*	20
SC CD	+0.19	21	+0.03	21
SC GP	−0.28	21	+0.69**	21
SC ME	−0.31	21	+0.19	21
GSR CP	−0.36	21	+0.56**	21
GSR EP	−0.19	21	+0.72**	21
GSR ME	−0.42*	21	+0.71**	21

* $p = <0.05$
** $p = <0.01$

to show smaller increments and greater decrements.

DISCUSSION

Our discharged and our still-hospitalized patients do differ physiologically; the differences, however, are not those predicted in the three theoretical propositions. What remains then of the postulated linkage between hostile behavior, poor prognosis, and norepinephrine-like reaction pattern and of the converse linkage—depressed behavior, good prognosis, and epinephrine-like reaction?

Hostile, over-active patients apparently have a poorer prognosis than do depressed ones. This relates outcome and behavior in the way predicted by the Funkenstein hypothesis and in the work of Feldman *et al.* (1). But physiological reaction pattern is not related in the predicted way either with outcome or with behavior. A parallel to this is seen in the results of Pasquarelli *et al.*. (**8**). In that investigation relations were studied among the Funkenstein test prognosis and behavior ratings of adequacy of affect. Although there was some tendency for the Funkenstein groupings to relate to prognosis and to the behavior ratings, it was only the relationship between behavior and prognosis which reached an acceptable level of significance. Prediction of prognosis on the basis of overt behavior was more accurate than prediction on the basis of these physiological measures.

The consistent differences between H and D groups suggest that they should be seen as two physiological populations. They do not differ in the way suggested by the Funkenstein propositions, and in some cases the differences are directly contrary to these propositions. The still-hospitalized patients have higher resting level measures than do those who were discharged but it is the discharged who tend to show greater increments to stressful stimulation.

This is consistent with Williams' (**9**) observation that early chronic schizophrenic patients differ from normal controls in having higher physiological resting levels and showing less increment to stress. Apparently our subjects with poor prognosis differ from those of better prognosis in much the way that Williams' schizophrenics differed from his controls. From our data, at least, it would seem that this difference is better explained not by different mechanisms of response but rather by the origin of the stimulus, to which the physiological response characteristically comes in the two groups. The poor prognosis subjects are, following Malmo *et al.* (**7**), responding to persistent internal ideation and, therefore, have high resting autonomic levels. The good prognosis subjects are more responsive to external stimulation and, therefore, show a greater response to a stress situation.

SUMMARY

Funkenstein and his associates have linked prognosis in psychosis, a preponderance of epinephrine-like reaction over norepinephrine-like reaction in stress, and an inward direction of psychological response to a stressful situation. It was hypothesized that in a psychotic group 1), good prognosis should be associated with an epinephrine-like reaction, 2) norepinephrine-like reaction should be associated with an externalized direction of anger under stress, and 3) poor prognosis should be associated with an externalized direction of anger under stress.

Twenty-six newly admitted psychotic patients were subjected to three stresses: cold pressor test, epinephrine injection and mecholyl injection. Measures were made continuously of seven physiological variables: systolic blood pressure, diastolic blood pressure, heart rate, ballistocardiograph amplitude, respiration rate, skin conductance, and, number of GSR's during rest, stress, and recovery period. The first hypothesis was not upheld; there was some tendency for the results to go counter to the hypothesis. The second hypothesis, tested only on small groups, was also not upheld. The third hypothesis was confirmed. Thus prognosis seems to be related to externalization of response to stress but not to the epinephrine-like pattern of physiological response, nor does this physiological response relate significantly to externalization following stress.

Analysis of the physiological difference between good prognosis and poor prognosis groups showed the good prognosis subjects with lower mean resting levels and showed more rise in response to stress—thus paralleling the difference found by Williams between normal and schizophrenic groups.

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URINARY AROMATIC METABOLITES IN NORMAL SUBJECTS AFTER LSD

MINORU MASUDA, PH.D.[1] AND THEODORE L. DORPAT, M.D.

INTRODUCTION

Similarities between the psychic state produced by lysergic acid diethylamide (LSD-25) and that of schizophrenia have served to focus attention on possible metabolic derangements in mental illness. Since the indole nucleus is characteristic of many psychotomimetic drugs, *e.g.*, LSD, bufotenin, dimethyltryptamine, the possibility has been envisaged of a similar endogenous indolic substance in schizophrenics. On the basis of the *in vitro* antagonism of LSD to serotonin on smooth muscle, Woolley and Shaw (12) postulated that the psychic effect of LSD was mediated by alterations in the metabolism of brain serotonin. Evidence relating serotonin to LSD is found in a report by Rodnight and McIlwain (10) that LSD ingestion reduced the excretion of urinary serotonin.

Related to the above are the findings of altered urinary indolic excretion patterns in schizophrenics (4, 6, 7, 8) indicating a possible abnormality in the metabolism of tryptophane. Whether this aberration is a result of schizophrenia or contributory to the development of schizophrenic symptoms is unknown.

It has been argued that the drug induced mental changes of LSD are not strictly comparable to the aberrations seen in schizophrenia, but the similarities of the "model psychoses" of LSD and endogenous psychoses lead to the possibility that the biochemical mechanism by which both occur may proceed along similar pathways.

This study had a two-fold purpose: 1) to survey the urinary aromatic metabolites during the LSD effect to ascertain whether any alteration occurred in the excretion of these substances; 2) if such an alteration occurred, to compare this with the aromatic excretion patterns found previously in acute schizophrenics.

METHOD

Twenty-three young medical and graduate students were used in the study, twenty-one males and two females. The subjects were given LSD (1 μgm/kgm) orally at 8:00 a.m. of the experimental day while in a fasting state, breakfast being omitted. All subjects showed behavioral changes similar to those described by others (9). A control series of twenty subjects, in which conditions were duplicated except for the ingestion of LSD, was evaluated. Twelve subjects in the control series also participated in the LSD series. No dietary restrictions were imposed except for the omission of breakfast.

Urine was obtained through four consecutive collection periods.

1. A pre-LSD overnight collection from bedtime to arising;
2. a morning collection from arising until noon, this period encompassing the height of LSD action;
3. an afternoon and evening collection from noon until bedtime;
4. a second overnight collection.

Aliquots of urine were processed by the method previously reported (7). In brief, the process included adsorption of the metabolites on deactivated charcoal and subsequent elution with aqueous phenol. The crude extract was taken up in isopropanol-methanol and subjected to the two following bidimensional paper chromatographic systems.

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[1] Department of Psychiatry, University of Washington School of Medicine, Seattle, Washington. This investigation was supported in part by Research Grants #M-2552-CM and #M-1948, from the National Institute of Mental Health, Public Health Service. LSD-25 was generously supplied by the Sandoz Chemical Works, Inc.

1. The descending system of Dalgliesh (3), using Ehrlich's reagent for resolution of indoles and amines;
2. the descending system of Armstrong *et al.* (1), using diazotized sulfanic acid for the resolution of phenolic acids.

Tentative identification of spots was made on the basis of comparison of Rf rates and spot colors with known materials run in the same systems pure or added to urine extracts. Use was also made of the data of other investigators employing the same systems.

Relative quantitative estimations of metabolites were made on the basis of surface area of the spots which are in direct relation to the concentration. In order to estimate surface area, tracings of the spots were cut out and weighed.

Comparisons of the metabolite excretions between periods were based on equivalent times of excretion (four minutes) rather than on comparable urine volumes or creatinine excretions.

RESULTS

A great number of aromatic metabolites have been found in normal urines according to these methods, forty-five in the Dalgliesh system and sixty in the Armstrong, most of which are unidentified. There is a duplication of some of these metabolites due to sensitivity to both reagents. No unusual metabolite was found regularly as a result of LSD ingestion.

Comparative results of estimation of metabolites in the four periods with LSD are shown in Tables 1 and 2. Also shown are tentative identifications and relative frequencies of occurrence of these metabolites. In these tables, for the sake of brevity, only the substances which were found to be significantly altered in excretion are listed. In these and succeeding tables, comparisons have been made on the basis of the first overnight period as a control period.

Table 1 shows the excretion of metabolites in the four periods as found in the Dalgliesh system (indoles and amines). Identifiable metabolites such as indoleacetic acid, 5-hydroxyindoleacetic acid, indican, urea and tryptophane were not found to be altered in excretion. It will be noted that all the metabolites found to be altered are reduced in excretion. These individual reductions are statistically significant but insufficient to cause a significant reduction in the mean total concentration ratings during the LSD intoxication in the morning and throughout the day. There is, however, a significant reduction in the mean number of spots during the height of LSD intoxication in period two. These metabolites are all unidentified although they are presumed to be indoles on the basis of the rose and purple hues with Ehrlich's reagent. They occur quite frequently in normal urine as shown in Table 1.

TABLE 1

Comparison of Excretion of Some Metabolites[a] *After LSD-25 (Dalgliesh System)*

Spot	Mean Weight of Spot Tracing in Mgms.				% Frequency of occurrence[b]
	Period I Pre-LSD overnight	Period II A.M. of LSD test	Period III P.M. of LSD test	Period IV Post-LSD overnight	
10	50.6		41.3*		87
11	6.93	1.93*	0.470*		39
12	5.33		0.950*		32
13	11.7		3.25*		47
17	11.4	3.04*			50
19	50.4	39.4*			96
Mean total concentration rating[c]	748.2	684.5	713.6	664.3*	
Mean number of spots	16.2	13.9*	14.6	14.6	

* Significant at 5% level (*t* test).

[a] Only metabolites found to be significantly altered from control period.

[b] As found in overnight urines of 76 normal subjects.

[c] Mean total concentration rating is the sum of weights of spot tracings in a chromatogram.

TABLE 2

Comparison of Excretion of Some Metabolites[a] after LSD-25 (Armstrong System)

Spot	Tentative identification	Mean Weight of Spot Tracing in Mgms.				% Frequency of occurrence[b]
		Period I Pre-LSD overnight	Period II A.M. of LSD test	Period III P.M. of LSD test	Period IV Post-LSD overnight	
1	p-hydroxyphenyl-acetic acid	45.7	35.7**		38.2*	100
8		4.76	1.44**			53
16	Feruloylglycine	3.47	0.956*			37
17	Vanilloylglycine	7.22	2.77**	13.2**		88
19	Vanillic acid	2.02		25.0**		17
65		5.47	0.661*			12
A		26.8	18.1*			91
B		45.1		34.3*		100
D		10.3	4.29*			70
J		4.98	0.914**			63
O		4.34	1.54**			53
UU		0.683		2.83*		11
Mean total concentration rating[c]		437.3	383.4*	441.1	402.4	
Mean number of spots		21.7	18.9*	21.8	21.0	

* Significant at 5% level (*t* test).

** Significant at 1% level (*t* test).

[a] Only metabolites found to be significantly altered from control period.

[b] As found in overnight urines of 76 normal subjects.

[c] Mean total concentration rating is the sum of weights of spot tracings in a chromatogram.

In Table 2 are shown the data on the excretion of metabolites (phenolic acids) resolved in the Armstrong system. During the height of the LSD effect, *i.e.*, the morning period, all nine metabolites whose excretions are significantly altered are found to be decreased. This is reflected in a significant reduction in the mean total concentration ratings and mean number of spots in the chromatograms during this period.[2] This is not true in the third period which shows significant increases of some metabolites over the control period. Of the metabolites listed in Table 2, four are tentatively identified as shown.

The second overnight or fourth period in both the Dalgliesh and Armstrong systems shows minimal changes from the first overnight control period, although the mean total concentration rating in the Dalgliesh system indicates a significant decrease.

The data on the series of control subjects are shown in Tables 3 and 4. In both the Dalgliesh and Armstrong systems, neither the mean total concentration ratings nor the mean number of spots is found to be significantly changed throughout the four periods. Whereas under LSD all metabolites found to be altered in the Dalgliesh system (Table 1) were reduced in excretion, this is not true in the control (Table 3). Under LSD there was a distinct reduction in total and individual metabolites found in the Armstrong system (Table 2) but this was not true in the control series (Table 4). Comparison of the changes which occurred with LSD (second period) and the comparable control period indicates that the changes occurring in the Armstrong system were sig-

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[2] The "t" test using the matched pairs method utilizing only the subjects common to both experimental situations shows that the mean total concentration ratings and the mean number of spots are significantly reduced (one per cent level) with LSD. The reduced excretion of individual metabolites shown in Table 2, however, did not reach significance in these statistics, presumably because of the reduction in N.

TABLE 3

Comparison of Excretion of Some Metabolites[a] in Control Subjects (Dalgliesh System)

Spot	Tentative identification	Mean Weight of Spot Tracing in Mgms.				% Frequency of occurrence[b]
		Period I Pre-LSD overnight	Period II A.M. of LSD test	Period III P.M. of LSD test	Period IV Post-LSD overnight	
1	Indican	78.8		89.6*	91.2*	99
7		13.5	2.44*		3.90*	51
12		5.65		9.65*		32
19		38.8		30.2*		96
70		8.13		0.495*		10
Mean total concentration rating[c]		670.0	632.9	653.9	635.4	
Mean number of spots		15.4	14.8	14.9	14.0	

* Significant at 5% level (*t* test).

[a] Only metabolites found to be significantly altered from control period.

[b] As found in overnight urines of 76 normal subjects.

[c] Mean total concentration rating is the sum of weights of spot tracings in a chromatogram.

TABLE 4

Comparison of Excretion of Some Metabolites[a] in Control Subjects (Armstrong System)

Spot	Tentative Identification	Mean Weight of Spot Tracing in Mgms.				% Frequency of occurrence[b]
		Period I Pre-LSD overnight	Period II A.M. of LSD test	Period III P.M. of LSD test	Period IV Post-LSD overnight	
16		8.76		3.38*	2.85*	37
17		7.12	4.79*			88
19		5.04		15.4*		17
24		1.06	9.64*			64
D		13.9		7.46*	7.42*	70
T		8.61	1.60*			8
Mean total concentration rating[c]		415.1	396.2	395.0	374.1	
Mean number of spots		19.8	19.6	19.5	17.4	

* Significant at 5% level (*t* test).

[a] Only metabolites found to be significantly altered from control period.

[b] As found in overnight urines of 76 normal subjects.

[c] Mean total concentration rating is the sum of weights of spot tracings in a chromatogram.

nificantly different ($p = .03$) by the chi-square test, but the changes in the Dalgliesh system were not. There was no apparent trend in the alterations of excreted metabolites in the control series in either system as was seen in the LSD experiments.

Comparability of overnight control periods (period 1) on LSD and non-LSD days was checked after allotting randomly to each group one-half of the subjects common to both days in order to avoid bias. There was no significant difference in the total concentration ratings by the "t" test.

DISCUSSION

The results of this study showed that there were distinctive changes in the excretion of aromatic metabolites under the influence of LSD. That these were not diurnal changes was shown by the control experiments without LSD in which similar alterations were not found.

The alteration in the indolic and amine excretion as seen in the Dalgliesh system was not marked, but there was an apparent trend toward a reduced excretion of some of the metabolites. This study did not bolster the report of Rodnight and McIlwain (10) of reduced serotonin excretion under the influence of LSD since the excretion of 5-hydroxyindoleacetic acid, the urinary metabolite of serotonin, was not altered by LSD.

The present finding of reduction of phenolic acids during the height of LSD intoxication was quite marked. Results of the control series reduced the possibility of the decreased excretion being due to omission of breakfast. Since urine flows during this period were not significantly different from controls, it is probable that the altered excretion of metabolites was not contingent on kidney function.

Of the nine aromatic metabolites found decreased after LSD ingestion in the Armstrong system, three were tentatively identified as indicated in Table 2: p-hydroxyphenylacetic acid, feruloylglycine and vanilloylglycine. p-Hydroxyphenylacetic acid, a normal urinary constituent, is apparently a metabolite derived from the body tyrosine pool via deamination through p-hydroxyphenylpyruvic acid.

Shaw and Trevarthen (11) have shown that ingestion of coffee and bananas leads to an increased excretion of indoles and phenolic acids; eleven of the latter group are detectable by our methods. Of these eleven, three metabolites, feruloylglycine, vanilloylglycine and unidentified spot No. 8, were reduced in excretion during LSD, but the other eight were not, an inconsistency difficult to explain. However, it is recognized that there is a distinct possibility that dietary factors may have played a part in influencing these results.

The evidence of an alteration in the metabolism of phenylalanine and possibly tryptophane under the influence of LSD implies an inhibition of some enzymatic process concerned in the metabolism of these amino acids. Studies of the effect of LSD on various enzyme systems (2) have not yielded any information on the mechanism of the psychologic effect or on the mechanism by which aromatic metabolism could be upset. One possibility may be that the emotional disturbance accompanying the drug effect could be contributory in altering the excretion of urinary aromatic metabolites.

A concurrent study (7) involved the use of these methods to investigate reported differences in aromatic excretion between schizophrenics and normal subjects. The study showed that there was a difference between these two groups which was highlighted by: 1) a minimum of qualitative differences between the two groups; 2) an increased indolic excretion in the acute schizophrenic group; 3) a lack of quantitative differences in total phenolic acid metabolites.

The effect of LSD on aromatic excretion is thus quite unlike the differences which are listed above. While acute schizophrenics excreted more indoles, subjects under LSD did not. The most noticeable alteration under LSD was the reduction of some phenolic acids; in the acute schizophrenics this was minimal. These dissimilarities of aromatic excretion patterns do not support the hypothesis of similar or identical metabolic derangements in schizophrenia and LSD "psychosis" (5).

SUMMARY

The urinary aromatic metabolites of twenty-three normal subjects under the influence of LSD have been comprehensively surveyed by semi-quantitative paper chromatographic methods. A control series without LSD has been similarly surveyed.

During LSD intoxication, there is a significant reduction in the excretion of phenolic acids.

The altered aromaturia found in the LSD group differs from the aromaturia found in

schizophrenics and from a normal control group as shown in a concurrent study.

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THIORIDAZINE THERAPY: RESULTS AND COMPLICATIONS

RUPERT H. MAY, M.D.,[1] PIROSKA SELYMES, M.D., ROBERT D. WEEKLEY, M.D.
AND ALBERT M. POTTS, M.D.

Several authors have recently reported on the therapeutic usefulness of thioridazine[2] in psychiatric patients (1, 2, 4–7). Special mention was made of the relative absence of side reactions usually observed during phenothiazine therapy, such as extrapyramidal hyperkinetic reaction (including pseudo-Parkinsonian reaction, hysteriform head-neck movements, drug induced restlessness), allergic reactions (agranulocytosis, photosensitivity), hepatic dysfunction, and seizural manifestations. The lack of pseudo-Parkinsonian reaction, especially, seemed to make thioridazine a medication of choice in those patients who developed Parkinsonism from other phenothiazines.

Thioridazine was used in twenty-nine patients at the Cleveland Psychiatric Institute, all females within the age limits of 21 to 58 years (mean 38.5 years). Nine of them were first admissions, however, not necessarily representing an acute onset of illness. Nineteen others had between two and seven admissions (average 3.4) and in one patient the admission number, due to its frequency, could not be established with certainty.

All but three patients had during this hospitalization one or more other types of therapy preceding thioridazine. These included: diphenylhydantoin sodium (one patient), procaine (one patient), prochlorperazine (one patient), meprobamate (two patients), imipramine (three patients), chlorpromazine (three patients), ECT (five patients); and seventeen had received perphenazine. Some of the latter had been on high dosages of this drug, due to the chronicity of their illness, due to frequent relapses, and to therapeutic resistiveness. Twelve of them had developed severe hyperkinetic reactions while on perphenazine.

The data concerning thioridazine therapy, including diagnostic categories, the total dosage ranges, duration of therapy, highest daily dosages used, and therapeutic response are presented in Table 1. The therapeutic response was classified as unsatisfactory in five patients. One patient was definitely improved permitting a social adjustment which, however, could not be maintained upon discontinuation of therapy. Twelve patients were judged to be very markedly improved and eleven were considered as "recovered"; later, however, some relapsed. This was, in part, due to the fact that the use of thioridazine in this hospital was temporarily discontinued upon appearance of ophthalmological complications. This necessitated interruption of therapy in some patients in whom the response so far had been very remarkable.

The side reactions observed are reported in Table 2. The ophthalmological reactions were in the form of a pigmentary retinopathy which was observed in four out of five patients having a total in excess of 85 gm., therefore suggesting a relationship between their occurrence and total dosage or total dosage/time. The fundus changes (Figures 1–4) are the subject of a separate communication (8). They appeared, subjectively, under the complaint of diminution and brownish coloring of vision, between twenty and fifty-five days following initiation of thioridazine therapy, but objective findings in the form of pigment deposits spreading from a middle zone be-

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[1] Cleveland Psychiatric Institute and Hospital, Cleveland, Ohio. Financial and other assistance by Sandoz Pharmaceuticals is acknowledged with thanks. The fundus photographs were taken by Robert Wright, M.D., courtesy of St. Luke's Hospital, Cleveland, Ohio.

[2] Trade name: Mellaril (Sandoz Pharmaceuticals).

TABLE 1

Thioridazine Dosage, Diagnosis and Therapeutic Response

Group	Total Dosage Range (mg.)	Diagnostic Categories	No.	Total Dosage (mg.)	Duration (Days)	Highest Daily Dosage (mg.)	Therapeutic Responses				Minor and Temporary Relapses	Severe Relapses, Re-Hospitalization, Still Hospitalized
							±	++	+++	++++		
1	Below 25,000	Psychoneurosis	1	Mn.	Mn.	Mn.	1					1
		Affective Psychosis	2	12,058	41	708	1		1			
		Involutional Psychosis	2	±8,411	±33	±681	1		1			
		Schizophrenia and Paranoia	6				1		2	3	1	1
		Chronic Brain Syndrome	2						1	1		
			13				4		5	4	1	2
2	25,000 to 49,999	Psychoneurosis	1	Mn.	Mn.	Mn.			1			
		Schizophrenia and Paranoia	4	35,789	60	1,714			2	2	1	1
		Chronic Brain Syndrome	2	±3,759	±41	±1,009	1		1			
			7				1		4	2	1	1
3	50,000 to 74,999	Psychoneurosis	1	Mn.	Mn.	Mn.				1		
		Schizophrenia	1	63,125	66	2,533		1				1
		Chronic Brain Syndrome	1	±32,798	±18	±1,147				1		
			3					1		2		1
4	75,000 to 99,999	Affective Psychosis	1	Mn.	Mn.	Mn.				1		
		Schizophrenia and Paranoia	2	88,988	43	3,600			1	1	1	
		Personality Disorder	1	±8,411	±17	±400			1			
			4						2	2	1	
5	100,000 and over	Schizophrenia	1	Mn.	Mn.	Mn.				1		
		Organic Brain Syndrome	1	100,600	43	4,000			1			1
				±400	±0.5	±0						
			2						1	1		1
Total			29	Range	Range	Range	5	1	12	11	3	5
				1,200–	4–181	200–						
				101,000		4,000						
				Mn.	Mn.	Mn.						
				39,786	49	1,766						
				±32,350	±39	±1,409						

tween the equator and posterior pole anteriorly and posteriorly, appeared only a few days later. The pigment coalesced into larger sheets. Three to four weeks following the initial pigment derangement, edema appeared which persisted for five to eight weeks. A concomitant loss of night vision and decrease in central visual acuity was severe in two of these patients, but improved later.

Muscular hypotonic reactions (expressed as muscular weakness and decrease of deep tendon reflexes) and night time confusional episodes (characterized by insomnia, rest-

TABLE 2

Side Reactions of Thioridazine Medication

Group	Dosage Range (mg)	No. of patients	No. of patients exhibiting no side reactions	Minor Side Reactions						Major Side Reactions		
				Tremor	Restlessness	Seizural exacerbation	Skin rash	Iridocycloplegia	Depression upon withdrawal of drug	Nocturnal confusion	Muscular hypotonia	Pigmentary retinopathy
1	Below 25,000	13	9	1	0	0	0	1	0	1	1	0
2	25,000 to 49,999	7	1	1	1	2	1	0	0	1	0	0
3	50,000 to 74,999	3	1	0	0	0	0	0	0	0	1	0
4	75,000 to 99,999	4	0	0	0	1	0	1	1	1	1	2
5	100,000 and above	2	0	1	0	0	0	0	0	0	0	2
Total		29	11	3	1	3	1	2	1	3	3	4

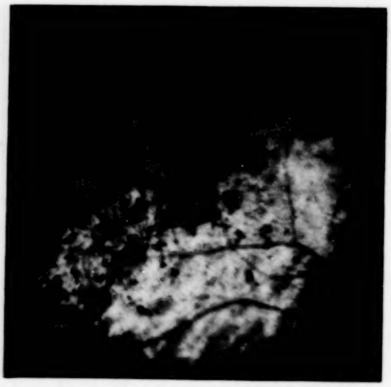

FIG. 1. Pigmentary retinopathy following thioridazine therapy. Early peripheral pigment clumping. The two very dense shadows in the center of this and the following figures are artifacts due to the carbon-arc illumination system.

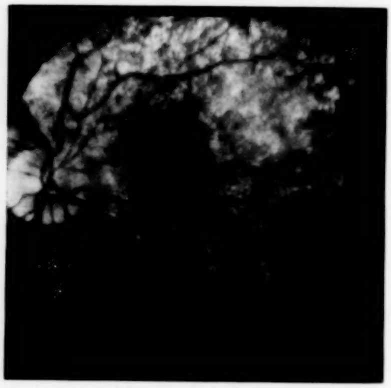

FIG. 2. Pigment plaques in the nasal retina.

lessness, and/or confabulatory hallucinations, all of which disappeared with the approaching daylight or with increase in other stimulation) seemed to be associated with the highest daily dose used, inasmuch as they were seen in six out of thirteen patients having received 1600 mg./day or more.

All other side reactions were minor and did not necessitate any change in therapy. They included: three instances of coarse tremor, not of the pill-rolling type (two of these in patients with a history of familial tremor), one case of minor drug-induced restlessness, exacerbation of known seizural diatheses in three patients, one instance of mild and transient allergic skin rash, mild irido- and/or cycloplegia (neither accompanied nor followed by objective fundus

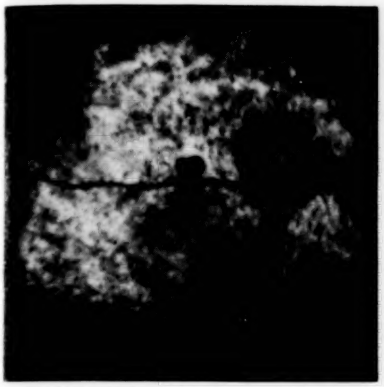

FIG. 3. Coalescing of pigment plaques resembling retinal nevi.

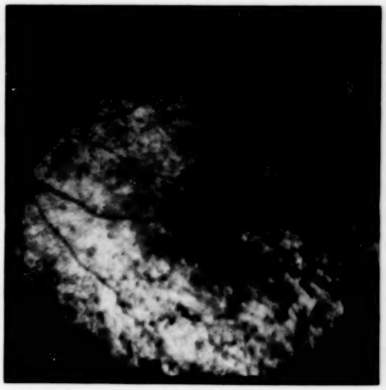

FIG. 4. Late peripheral pigment clumping. Choroidal vessels showing through depigmented areas.

changes) in two patients, and paradoxically, one occurrence of a mild depression upon withdrawal of the drug. The etiology of one case of mild and transient leukopenia (4350 WBC) seen during the decrease of medication in one patient is questionable as to etiological connection to the drug. Beside the reactions mentioned, oral dryness accompanied by increased thirst, milder forms of constipation, and a decrease in gustatory discrimination were frequent. While on higher dosages, patients usually discontinued smoking.

The EEG confirmed the seizural exacerbations mentioned above; it must, however, be stated, that in all instances where this occurred, an epileptic disorder or tendency had been diagnosed prior to thioridazine therapy. In one of the patients more seriously affected with pigmentary retinopathy, the EEG showed considerable slowing with voltage decrease and (clinically latent) increase in focal seizural activity at a time when the patient was in the best mental condition ever observed.

Noteworthy is the absence of major hyperkinetic reactions. While twelve out of the seventeen patients formerly on perphenazine had shown a pseudo-Parkinsonian reaction or (in one instance) a severe hysteriform head-neck syndrome, no such manifestations were noted on any of these patients while on corresponding therapeutic dosages of thioridazine (1 mg. perphenazine was considered equivalent to 10 mg. thioridazine). Based on the significance of the difference between proportions, this result was significantly different at the 0.01 level.

In conclusion, observations on the use of thioridazine confirm its therapeutic effectiveness in psychiatric patients. The eye reactions reviewed above indicate the necessity for precluding the use of this medication in high dosages and suggest that more intensive study into the effect of phenothiazines on the eye should be undertaken. For the buildup of necessary tissue levels, a daily dose below 1600 mg./day for a few days appears without danger (6), while the maintenance dose of 800 mg./day, now recommended, should not be exceeded. Upon appearance of any subjective or objective ocular findings, the drug should be discontinued. Frequent questioning, pupillary examinations and funduscopy are recommended especially when higher dosages than the optimal maximal recommended dose of 1600 mg. are given for a prolonged period of time.

Some patients still need maximum doses of phenothiazines for a long time in order to achieve a satisfactory clinical response. "Inadequate dosage explains therapeutic failure in many instances" (3). However, even though some of the patients in our series responded only to thioridazine, our findings suggest that where higher doses are indicated, some other drug should be used.

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CHANGES IN VERBAL TRANSACTIONS WITH INDUCED ALTERED BRAIN FUNCTION

JOSEPH JAFFE, M.D.,[1] MAX FINK, M.D. AND ROBERT L. KAHN, PH.D.

Repeated interviews with patients undergoing convulsive therapy reveal progressive changes in the interpersonal relationship, which are referable to verbal and non-verbal transactions. While non-verbal aspects of communication are difficult to quantify, techniques are available for the measurement of verbal behavior. Using such linguistic methods, we have observed systematic alterations in language patterns during convulsive therapy, which were related to independent evaluations of behavioral change and to improvement. The description of these language patterns has provided a useful quantitative method for understanding interpersonal changes which occur during therapy.

In a syntactic-content analysis of recorded interviews during convulsive therapy (6), such changes as denial (negation), qualification (subjunctive and adverbial modifiers), displacement (person and tense), and cryptic and clichéd remarks were scored. An increased incidence of these changes in the patients' speech was related both to the degree of induced altered brain function and to the evaluation of therapeutic response.

It has been clinically observed that when the language of the patient is affected by neurologic dysfunction, modification of the interviewer's speech patterns occur. In the syntactic-content analyses, in which a structured interview was used, the examiner's participation was restricted to statements in the questionnaire. This two-person interview group (or dyad) therefore assumed special characteristics. Interactive effects were minimized. The constraint of the questionnaire interrupted the reciprocal modification of the examiner's speech. In such a dyad, scoring of the patient's responses alone constituted an adequate description of changes in the verbal transactions of the two-person communication system.

Judgements as to mental status are usually arrived at in less structured conversations between doctor and patient. It was suggested that measurable changes in language patterns would occur even in conventional clinical interviews, and furthermore that such changes would be related to those observed in structured interviews.

The methods of dyadic analysis were developed (3–5) to permit a quantitative description of verbal transactions in unstructured interviews (diagnostic, psychotherapeutic). In this analysis, the speech of doctor and patient is considered as one continuous behavior, and the measurements are performed on consecutive units, irrespective of speaker. The verbal flow of the interview is thus considered as a single output, irrespective of speaker. The justification for this maneuver rests ultimately on the correlation of dyadic speech patterns with those obtained by other methods, and is an aim of the present study.

These scoring measures of unstructured interviews have been applied to weekly interviews with patients undergoing convulsive therapy. It is the purpose of this report to 1) determine the pattern of change in dyadic language measures with convulsive therapy; 2) study the relation of these measures to the degree of induced altered cerebral function; and 3) relate the dyadic scores to syntactic language measures obtained concurrently in structured interviews.

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[1] Department of Experimental Psychiatry, Hillside Hospital, Glen Oaks, Long Island, New York. This study was aided by grants 56-151, Foundations' Fund for Research in Psychiatry, and M-927 of the National Institute of Mental Health, U. S. Public Health Service. The technical assistance of Mrs. Jean Kolodny and Mrs. Ann Horowitz is gratefully acknowledged.

SUBJECTS AND METHOD

Twenty-seven consecutive referrals for convulsive therapy in a voluntary mental hospital were studied. On a random basis, ten patients were assigned to a control group and the remaining seventeen constituted the experimental group. Both groups were comparable for age and education; the convulsive group had a mean age of 47 and 11.7 mean years of education, while the mean age of the subconvulsive group was 47.8, with a mean of 10.5 years of education. The investigators had no part in the treatment process, and did not know which cases served as controls until data collection was completed.

The experimental (convulsive) group was given grand mal electro-convulsive therapy three times weekly, under pentothal premedication for a minimum of 12 treatments. The control subjects were treated in identical fashion except that they received subconvulsive electrostimulation while under pentothal premedication.

All patients were interviewed prior to treatment, and in the week of the 12th treatment. An unstructured clinical diagnostic interview technique was used centered about the patient's symptoms and life problems. The patient was encouraged to talk freely, with occasional guiding interventions by the interviewer. Long silences resulted in increased interviewer activity. All interviews were tape-recorded.

For the formal dyadic analyses (3, 5), the first 500 words of each interview were transcribed in temporal sequence without regard to the speaker. This sample of dyadic speech was divided into consecutive 25 word units. The type-token ratio (TTR) was calculated for each unit. The type-token ratio is the number of different words (types) divided by the total number of words (tokens). Thus, the lower the TTR the more repetitive the interaction. For these studies, both the mean and standard deviation of the TTR distribution of each interview sample was obtained.

For the syntactic speech analyses the patient was seen by another examiner during the same intervals. This interview consisted of a standardized questionnaire composed of specific items concerning the major complaint, reasons for coming to the hospital, and temporal and spatial orientation (9). The verbatim responses were analyzed for the presence of syntactic language changes previously described as occurring with induced cerebral dysfunction (6).

Prior to, and at weekly intervals during treatment, an electroencephalogram was recorded in each patient. These records were measured for the per cent time of induced slow wave activity (1).

In the dyadic TTR analyses, experimental (convulsive) and control (subconvulsive) groups were compared. In relating dyadic TTR changes to induced slow wave activity and to syntactic language analyses, the mode of treatment was disregarded, all patients being considered as a single group.

RESULTS

1. *Dyadic TTR:* A consistent change was observed in the TTR patterns of the experimental group. Scores for consecutive 25 word units of interaction in 500 word samples were plotted before and during the treatment course (end of the fourth week). Figure 1 shows a graph of the TTR patterns for one patient. Next to each graph is the frequency distribution of the 20 consecutive scores shown. The change in the distribution for this case was a decrease in the mean and an increase in the standard deviation of the dyadic TTR. This pattern of change was characteristic of the experimental group.

Table 1 shows changes in the group mean TTR score during treatment. Although there was a decrease in both groups, the change was significant ($p < .01$) only in the convulsive group and not in the control (subconvulsive) group.

Table 2 shows the changes in standard deviation of the group TTR scores during treatment. There was a significant increase in standard deviation ($p < .01$) in the convulsive group. In the control (subconvulsive) group the standard deviation was decreased during treatment. The change, however, did not reach statistical significance.

2. *Relation of Dyadic TTR to EEG changes:* The changes in dyadic TTR scores were related to changes in brain function as reflected in measurements of the amount of slow wave activity on the electroencephalogram. For this purpose, the per cent time delta activity in the EEG record obtained in the same week as the interview was used.

While almost all members of the experimental group developed prominent amounts of EEG delta activity during treatment, none of the control group demonstrated such changes. Using the method of rank order correlation, the change in standard deviation of the dyadic TTR correlated +.65 with the per cent time of delta activity ($p < .01$). The greater increase in variability in the language measure was thus associated with the greater degrees of altered brain function. Changes in the mean TTR, however, were not significantly related to the changes in brain function ($r = +.19$).

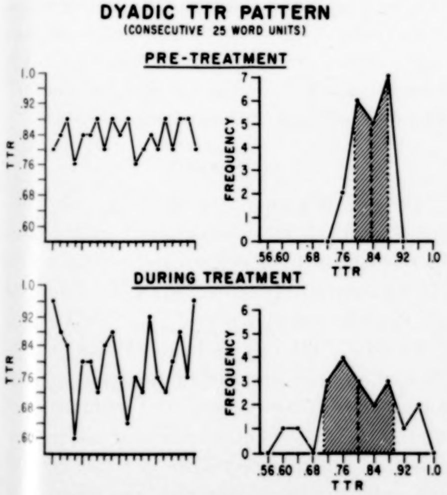

FIG. 1. Plot of TTR patterns for one patient (see text).

TABLE 1

Change in Mean TTR with Electroshock

Group	N	Pre-treatment	During treatment	Difference
Subconvulsive	10	81.1	80.3	−0.8
Convulsive	17	81.6	79.2	−2.4*

* Significant at 0.02 level, using Wilcoxon's method of paired replicates.

TABLE 2

Change in Standard Deviation of TTR with Electroshock

Group	N	Pre-treatment	During treatment	Difference
Subconvulsive	10	8.6	8.1	−0.5
Convulsive	17	7.6	9.2	+1.6*

* Significant at 0.01 level, using Wilcoxon's method of paired replicates.

TABLE 3

Relation of Syntactic and Dyadic TTR Language Measures

Syntactic Analysis	N	Dyadic Analysis: Change in Mean	Dyadic Analysis: Change in Standard Deviation
Fewer than two changes	15	−0.8	−0.1
Two or more changes	12	−3.0**	+1.4*

* Significant at 0.02 level.
** Significant at 0.01 level.

3. *Relation of Dyadic TTR to Syntactic Language Changes:* A comparison of dyadic TTR scores with syntactic aspects of the patient's speech obtained in independent structured interviews was made. The patients were divided into those who showed two or more syntactic language changes, and those who showed fewer than two such changes, regardless of the type of treatment (Table 3). For the patients showing

two or more syntactic changes, both dyadic indices showed a significant change during treatment. There were no significant alterations in TTR indices for the group showing fewer than two syntactic changes.

DISCUSSION

These observations indicate a significant difference in dyadic transactions in the experimental (convulsive) and control (subconvulsive) groups—a difference which is referable to a consistent change in the subjects receiving convulsive therapy. The findings are consistent with those reported by Weinstein and Kahn (9) in their studies of patients with altered brain function. They observed increased use of the second and third person, non-aphasic misnaming, clichés, stereotyped expressions, condensations and neologisms. These language patterns were termed the "language of denial" and were regarded as symbolic adaptations. Kahn and Fink (6) noted similar language changes in patients with brain function altered by convulsive therapy. The present observations indicate that verbal transactions during altered brain function are not only more stereotyped qualitatively, as in the use of clichés, but are also more stereotyped quantitatively as in the increased repetition of words. Thus, analyses of the more formal aspects of speech parallel analyses of content.

Alteration in brain function was also related to changes in the dyadic indices. The low, but significant correlation between the dyadic scores and EEG delta activity suggests that the two-person communication system as a whole may reflect neurophysiological alteration in one of its participants. The low correlation is consistent with previous observations that the dyadic TTR pattern is sensitive to factors other than altered brain function (5).

Other studies of the dyadic TTR and syntactic language measures during drug administration (2) are consistent with the present findings. Administration of agents which produce EEG hypersynchrony similar to that of convulsive therapy was associated with changes in both language measures in the direction of increased stereotypy and repetitiveness. Agents which produced EEG desynchronization, however, were associated with decreased repetitiveness and a decreased number of syntactic alterations. These observations, though limited to acute drug interviews, indicate that similar changes in language patterns can be anticipated in subjects following the chronic administration of psychotropic compounds. We anticipate that alteration in patterns of language may provide cues for the evaluation of behavioral change in drug therapies as well as in convulsive therapy.

It is of significance that changes in dyadic speech are measurable when the neurophysiological status of only one of the participants is altered. This observation is consistent with concepts of verbal behavior as a two-person phenomenon, inseparable from its interpersonal context (7, 8, 10). The method and findings also demonstrate that neurophysiologic effects can be investigated in unstructured interviews and that the results may be related directly to those obtained under more structured experimental conditions. Thus, the measurement of formal aspects of language in clinical interviews may be viewed as another tool of neurophysiologic investigation.

CONCLUSION

Formal language measures in unstructured clinical interviews were undertaken in the course of a study of convulsive and subconvulsive therapies in a hospitalized psychiatric population.

Dyadic TTR (Type-Token-Ratio) measures showed a significant decrease in the mean and an increase in the standard deviation in the subjects receiving convulsive therapy, but no differences in those receiving subconvulsive therapy. The degree of change in dyadic indices was related both to the degree of induced delta activity on the electroencephalogram, and to changes in syntactic language patterns obtained in independent structured interviews.

Theoretic implications for the understanding of language changes during altered brain function were discussed.

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MIGRANOID HEADACHE RELATED TO CEREBRAL ANEURYSM

WOLFGANG A. FROELICH, M.D.[1]

Intraocular manifestations of migraine are rare. Wegner (13) states that vascular spasm, dilatation, and partial or complete thromboses may be seen, and that choked disc is mentioned occasionally in the older literature. Vasospastic phenomena, venous and arterial occlusions, retinal edema, retinal and vitreous hemorrhages have been described by Löhlein (8), Graveson (4), Grønvall (5), Friedman (3), and others. Friedman collected 14 such cases from the literature and reported one—his own—showing central retinal vein occlusion. Friedman's patient had negative angiograms and air-studies. Chambers, cited by Walsh (11), held the opinion that it is more usual to see the retinal arteriolar spasm of migraine at the periphery of the fundus. Excluding rare cases of vascular occlusion, Walsh (10) held that the vasospastic phenomena of migraine usually do not threaten vision.

The majority of reports of intraocular manifestations of migraine stem from the pre-angiography era, and the present report emphasizes the importance of angiography in the evaluation of signs which collectively might otherwise have been attributed to an unusual manifestation of migraine.

CASE REPORT

A 19 year old housewife was admitted because of severe, intermittent unilateral headaches of five days duration. The onset was sudden, occurring one week after the uncomplicated term delivery of her second child. The patient described her headache as a dull, non-throbbing, always left-sided, recurring pain, localized to the left periorbital and fronto-temporal region. The pain had a quick crescendo, lasted from one-half to several hours, and disappeared gradually, often leaving a vague sensation of soreness around the left eye, temple and upper gum, sometimes extending to the left sub-occipital area. One to several such attacks occurred in a day, some associated with nausea. There was no vomiting. Slight swelling of the left upper and lower lids might appear, but there was no nasal congestion, increased lacrimation, visual loss, syncope or stiffness of the neck. Pressure on the globe somewhat ameliorated the pain, but commonly used analgesics were ineffective. Typically the attacks were preceded by a feeling of coolness localized to the area where the pain was subsequently experienced. This prodrome could last 15 minutes. There were no visual or other prodromal manifestations of neurological interest.

The headaches actually proved to be of two and one-half years duration and had first been experienced during the eighth month of her first pregnancy. They had occurred intermittently for several weeks and disappeared upon delivery of her first child. In the interval she has had periodic headaches of the same character which lasted a day or two and were much less severe.

At the age of six the patient had a small esotropia of the left eye which was successfully treated with orthoptic exercises and did not recur. She also reported that colors viewed with the left eye did not appear as bright as those seen with the right eye (although using the left eye alone she could discriminate colors accurately). This resulted in objects having less contrast when viewed with the left eye. Otherwise her relevant past history was unremarkable.

Both the patient's mother and maternal

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[1] Division of Neurology, Washington University School of Medicine, St. Louis, Missouri. The cooperation of Professor H. G. Schwartz of the Neurosurgical Division is gratefully acknowledged. Thanks are also due Dr. Irvin P. Pollack for the fundus photographs.

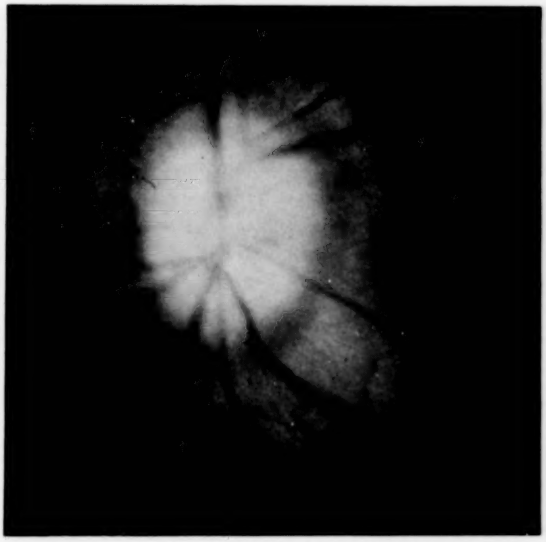

FIG. 1. Photograph of the left fundus at the time of the first admission showing edema of the disc and arteriolar spasm.

grandmother had a history of "sick headaches" with visual aura.

The general physical examination was entirely unremarkable. Blood pressure was 130/70, pulse 72/min. Neurologic examination: Sense of smell, intact. Extra-ocular motor function, normal. The pupils were equal, measured about 3 mm. in diameter, and showed prompt direct and consensual and usual accommodation reaction. The right fundus was normal, but there was an accumulation of fluid in front of the left disc which gave it a swollen appearance. This edema extended into the retina in the proximity of the disc, particularly superiorly and inferiorly, but did not involve the macula. The retinal arterioles were markedly constricted, particularly at the periphery. There were no hemorrhages or exudates (Figure 1). The peripheral field of vision of O.S. showed slight generalized constriction, but no localized field defect. At one meter there was enlargement of the blind spot to 1 and 10 mm. test objects. The central and peripheral field of O.D. was normal. Visual acuity O.S.: 20/20+I, O.D.: 20/13. There was no exophthalmos. Intraocular tension was 8 mm. by applanation on the right, and 6 mm. by applanation on the left (Normal, 12–20 mm. Note that intraocular hypotension is seen with pregnancy and thus its significance was doubtful in this case). Facial and corneal sensations were normal. There was no deficit of the other cranial nerves, no nuchal rigidity, no motor or sensory loss, and no cerebellar signs. The deep tendon reflexes were normally active bilaterally; abdominal reflexes were equal, and toe responses plantar. There was no cranial or ocular bruit.

Skull and chest X-rays were normal. The EEG was interpreted as indicating no significant abnormality. Lumbar puncture showed an opening pressure of 80 mm., with colorless fluid and no cells; a protein of 29 mg.%; sugar of 64 mg.%; Wassermann, negative; and colloidal gold, 0000000000.

Cafergot was found to be immediately effective in the treatment of subsequent bouts of headache. Although the headaches disappeared completely after two weeks, there was no change in the state of the left fundus. It was felt that an angiogram was indicated for further clarification of this atypical feature of an otherwise migrainous affliction. It was decided, however, to postpone the procedure until the marked arteriolar spasm in the distribution of the left ophthalmic artery had resolved, and the patient was accordingly discharged.

The patient regularly returned for a weekly eye examination. She continued to have occasional mild attacks of pain which responded promptly to Cafergot. About eight weeks after discharge the arterioles were less constricted and the patient was readmitted for bilateral angiography. The left carotid angiogram revealed a saccular aneurysm upon the internal carotid just above the emergence of the ophthalmic artery (Figure 2).

The internal carotid was exposed through a left frontal craniotomy (Prof. H. G. Schwartz). The aneurysm was demonstrated to arise from the internal carotid just above its traverse of the dura. It measured 4-6 mm. and extended medially and anteriorly from the parent vessel. Its tip indented the optic nerve from below and laterally. The origin of the ophthalmic artery was immediately proximal and adjacent to the neck of the aneurysm. There was no evidence of recent or remote hemorrhage. The neck of the aneurysm was clipped, sparing the ophthalmic artery (Figure 3), and the postoperative course was uneventful.

For the past six months the patient has been seen at regular intervals. Without

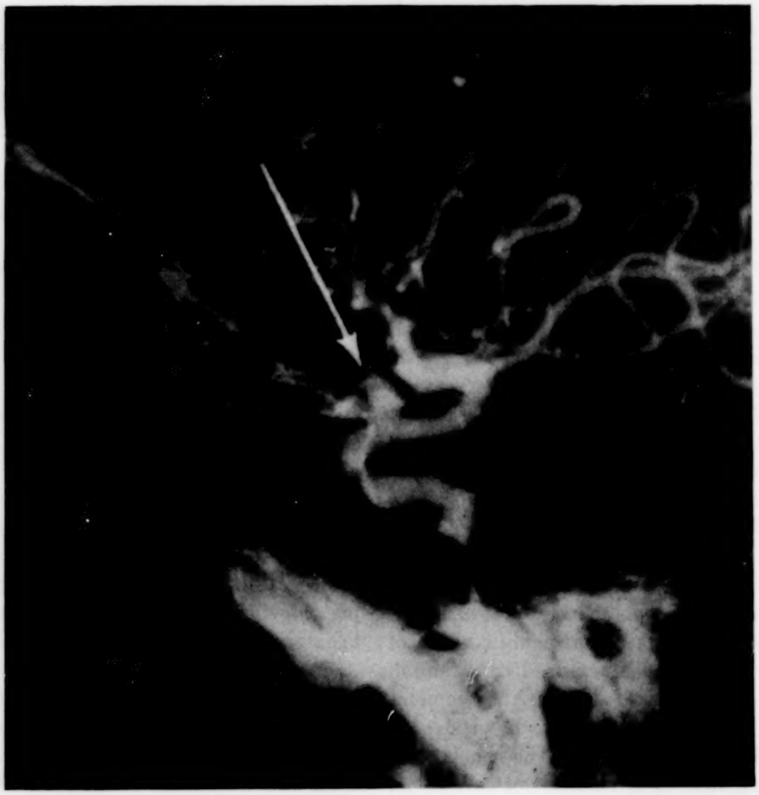

FIG. 2. Left carotid arteriogram. Arrow indicates the saccular aneurysm. Note the proximity of the aneurysmal neck to the emergence of the ophthalmic artery.

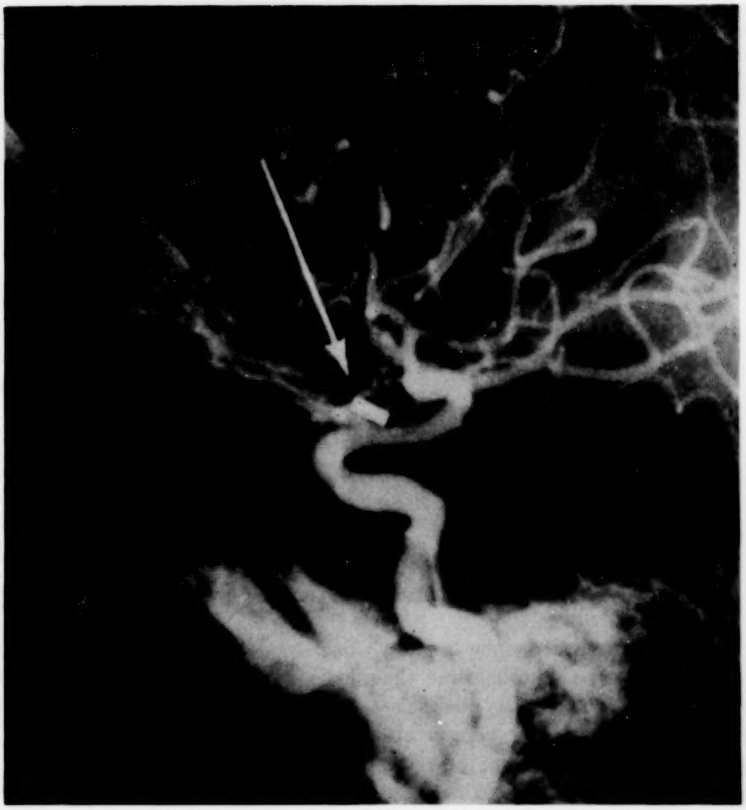

FIG. 3. Post-operative left carotid arteriogram. Arrow indicates the clip on the neck of the aneurysm. Note good filling of the ophthalmic artery.

medication she has remained completely free of headaches. Her fundoscopic picture has now improved (Figure 4). The arteriolar spasticity is less marked, although there is still a noticeable difference in the vascular appearance of the left compared with the normal right eye. The disc is no longer edematous, its margins are more clearly defined and there appears to be slight gliosis of the disc. There have been no changes in the visual fields or in acuity.

Walsh and King (12) have stated that pain of sudden onset in and about the eye is probably the most frequent symptom of aneurysm. Critchley and Ferguson (1) and many authors have since emphasized that aneurysm should be suspected when unilateral headaches invariably occur on the same side. They also observed that visual scotomata and vomiting can be conspicuously absent in migrainoid syndromes due to aneurysm. Neighborhood signs reported with cerebral aneurysm (2, 6, 7, 9) such as oculomotor palsies, fifth nerve deficit, or evidence of optic nerve, chiasmal or optic tract compression, were absent in our case, and the headaches responded to Cafergot. The suspicious finding which led to angiography was the unilateral fundus change with arteriolar spasm, papilledema and absence of field or acuity loss (except for enlargement of the blind spot) in the face of normal spinal fluid manometrics. It was not thought that the papilledema was of the

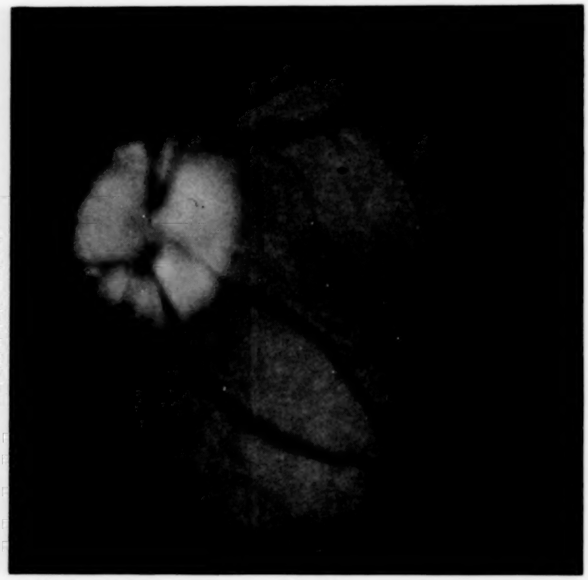

FIG. 4. Left fundus photographed four months after surgery.

type which results from ischemia because acuity was not impaired. Neither was the papilledema the result of venous stasis because the veins retained their normal appearance. Clinically, pressure on the optic nerve could not be hypothesized because there was no visual field defect. Yet at operation the aneurysm was found to have slightly indented the optic nerve from inferiorly and laterally, so that an upper nasal field defect should have been expected. Papilledema without rupture of the aneurysm, and without impairment of venous backflow or field loss must be considered a rare occurrence and can perhaps be explained by partial blockage of the arachnoid sheath of the optic nerve by the aneurysm. The vasospasm in the ophthalmic distribution may be explained by an aneurysmal site in close proximity to the emergence of the ophthalmic from the carotid artery.

SUMMARY

A case of migrainoid headaches is presented. Unusual features were arteriolar spasm in the ophthalmic artery distribution ipsilateral to the pain and coincident papilledema without field or acuity loss, hemorrhage or extraocular palsy. The headaches responded to Cafergot, but an angiogram revealed a saccular aneurysm of the intracranial carotid situated in juxtaposition to the origin of the ophthalmic artery. The mechanism of this rare intraocular manifestation is discussed. The demonstration of the aneurysm by angiography was necessary to clarify these unusual manifestations. In the pre-angiography era the eye findings might well have been ascribed to migraine.

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THE POLYGRAPHIC RECORDING OF A REPEATED HYPNOTIC ABREACTION WITH COMMENTS ON ABREACTIVE PSYCHOTHERAPY

KENNETH LIFSHITZ, M.D.[1] AND JOHN H. BLAIR, M.A.

INTRODUCTION

"Our observations have often demonstrated that a memory of this kind [relating to psychic traumas] which had hitherto provoked such [hysterical] attacks lost this power as soon as it was brought during hypnosis to a reaction or to associative readjustment" (5). This statement appears in a paper published in 1892 by Freud and Breuer, entitled "On the psychical mechanism of hysterical phenomena." Four years later Freud abandoned the use of hypnosis in psychotherapy, and offered two reasons for doing this. The first was that success seemed to depend upon the patient's relation with the physician, and if this relation were disturbed the symptoms reappeared. The second reason was that in Freud's experience only a small number of people could be put into a deep state of hypnosis (4). Apparently Freud did not abandon the technique of hypnotic abreaction because he felt it was useless, but rather because he felt that there were more useful techniques available. (An interesting discussion of Freud's relation to hypnosis is to be found in Kline's book, *Freud and Hypnosis* (13).)

World War II brought a resurgence of abreactive therapy and numerous psychotherapists, using abreactions induced by hypnosis, parenteral barbiturates, and inhalational anesthetics, pointed out its beneficial effect, particularly on the acute traumatic neuroses (2, 3, 7, 11, 14, 18, 19, 21). A review of the historical development of abreactive techniques may be found in several papers including Shorvon and Sargant's (20) and Brenman and Gill's (1). It has been pointed out by various authors (7, 11, 14, 16, 18) that the beneficial effects for the patients were made more lasting by further therapy and the waking discussion of the abreacted material. Some investigators, including Edkins (3), and Shorvon and Sargant (21), noted that repeated abreactions may be necessary in order to effect a beneficial result. Edkins reports a study based on 44 patients and states that an average of eleven and one-half sessions were necessary for maximum benefit. Shorvon and Sargant state that as many as four or five abreactions of the same incident may be necessary before relief occurs. These authors postulate that the beneficial results of abreactive therapy occur chiefly as the result of the sudden state of emotional collapse which sometimes occurs at the termination of an abreaction. They feel that this is equivalent to the Pavlovian phase of "ultraparadoxical cortical inhibition" and that during this phase there may be a "break up" of "recently acquired conditioned behavior." Houston (12) also subscribes to this viewpoint. At the opposite extreme is Conn (2) who believes that it is possible for the patient to "quietly discuss his harrowing experiences" and obtain benefit. "It is not the recall of the traumatic experience which is of therapeutic value, but the patient's acceptance of what he thought, felt and did without the need for neurotic defenses." Hordern (10), using abreactive techniques in a number of "neurotic personalities," of which he describes six in detail, states, "In comparatively few cases was Sargant's stage of complete inhibition reached, nor was it considered necessary to push the patient to that point."

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[1] Rockland State Hospital, Orangeburg, New York. The authors would like to express their appreciation to Harlan Stearns for his assistance in obtaining the polygraphic recordings.

Certainly it is a *sine qua non* of psychotherapy that intellectualization of experience has little therapeutic value and it is the affective experiences in psychotherapy which are beneficial. An abreaction is an extremely marked affective, non-intellectual, re-experiencing of previous perceptual impressions. The possibility of placing emphasis on this point is seen in Symonds' paper on "A comprehensive theory of psychotherapy" (**22**). He investigated 68 reported changes of behavior, attitude or feeling in psychotherapy. Fifty-nine of these changes followed abreaction, seven followed interpretations and two related to changes in perception. Symonds theorizes that the basic factor promoting change in all psychotherapy is abreaction.

From the foregoing it is reasonable to suggest that: 1) something in the patient frequently changes during an abreaction, 2) repetition of a particular abreaction may be necessary in order to effect a change, and 3) the change which occurs may not be lasting.

It seemed to us that classical conditioning and adaptation theory could serve to explain these three observations. If one considers a particular (traumatic) incident which poses a threat to the organism as an unconditioned stimulus, the anxiety, fear, and concomitant physiological alarm reaction can be considered as the unconditioned response. Any associative stimuli which recall this response can be considered as the conditioned stimulus and will evoke a conditioned response similar to the unconditioned one.

If a particular traumatic incident could be repeated without the reinforcement of the unconditioned stimulus one would expect extinction by adaptation to occur. If a traumatic incident is abreacted under hypnosis it would be reasonable to assume that at some particular point the subject would recognize that the feared results of death, pain, ego disruption, etc. are not going to occur. (This might be considered to be somewhat analogous to Lashley's statement (**15**) on the significance of "affective reinforcement" for the conditioning process. "Corresponding to the nature of the conditioning stimulus, there is fear of electric shock, objectively demonstrable by cardiac and respiratory change, anticipation of acid in the mouth with slight nausea, . . . unless this affective element is aroused, the conditioned reflex does not occur. So called extinction of the conditioned reflex is not a weakening of the specific association, but a waning of the affective reinforcement.") At this point the rules of adaptation would occur. Among these rules are (**8, 9**):

1. Adaptation is cumulative; the greater the number of repetitions the greater the decrement. Although the course is progressive the rate is not constant (or in other words repeated abreactions may be necessary to achieve beneficial results).
2. Adaptation is a function of the rate of elicitation of the response—a faster rate of stimulation yields a more rapid adaptation, (or as stated by Edkins (**3**), "if the intervals between sessions is more than a week, progress is apt to be slow").
3. Adaptation is not permanent. During an interval of time following adaptation, the inhibited response spontaneously recovers in strength. Spontaneous recovery tends to be incomplete, (or psychotherapy is necessary following abreaction for permanent results, as stated by Kubie (**14**) and by Edkins (**3**); the patient may have a relapse of symptoms necessitating abreactions at some later date).

EXPERIMENT

The experiment here reported is an attempt to test the hypothesis that abreactions result in the extinction of the affective responsivity recallable from a particular traumatic incident and that this extinction follows classical conditioning laws.

The volunteer subject was a 23 year old female secretarial worker. There was no reimbursement except on two occasions when the experiment necessitated that she work overtime. The subject had no knowledge of the nature of the experiment and only lay knowledge of psychological theory. A review of the data and the tape recordings of sessions yielded no indication that cues, from the hypnotist to the subject, contributed to the results.

Psychiatric interviews disclosed no evidence of clinical psychiatric disease in the subject. A clinically normal subject was chosen rather than a patient because there was less chance of running into distortions due to individual pathology. The physiological concomitants of the abreaction were continuously recorded on a Grass polygraph. Respiration; galvanic skin response; heart rate; integrated frontalis muscle potential; cheek temperature and room temperature for comparison; and total body movement (as indicated by bed movements) were recorded.

The subject was easily hypnotized to the "somnambulistic" level. This level was tested by the presence of positive and negative hallucinations producible by post hypnotic suggestion and by the presence of a nonsuggested, complete, post hypnotic amnesia.

In the first recorded session, the patient was hypnotized and then age regressed back to a non-specific "frightening experience." An abreaction was then induced for this experience. On subsequent occasions she was age regressed back to the same time and an abreaction of the same incident induced. The experiment was performed at the following time intervals: 14 days, seven days, seven days, five days, three days and two months.

The abreacted incident occurred when the subject was 10 years old. She was at the beach with her father and waded too far out into the water, was knocked down by a succession of waves, inhaled and swallowed water, and was in fear of drowning when rescued by her father.

In this case we may consider the unconditioned stimulus, the near drowning; the unconditioned response, the fear of suffocation and destruction with the associated massive psychological and physiological alarm reaction; the conditioned stimulus as the associative recall of the incident (in this case aided by hypnosis); and the conditioned response the same as the unconditioned response.

The results of the analysis of the polygraphic recordings are shown in Table 1. The duration of the abreaction was indicated by the patient's facial expressions and corresponds closely to the duration as indicated by the increased respiratory rate. The respiration during the abreaction was taken as the maximum respiration over any 20 second interval of the abreaction and this was multiplied by three to convert it into the usual respirations per minute. The GSR reactivity was measured as the number of unequivical GSR waves which occurred during the period of the abreaction. The basal heart rate was determined by the average rate during the 20 second period immediately prior to the induction of the abreaction. The maximum heart rate was the maximal value during the abreaction, (excluding any transitory acceleration which appeared due to the respiratory reflex). Unfortunately no cheek temperature recording was recorded for the session on 4/24. However, a toe temperature was adequately recorded at that time and showed a definite fall in temperature.

In order to check the possibility that changes in this abreaction were due to general factors rather than to specific ones, the abreaction of other traumatic incidents was measured similarly at various times. These continued to show marked poly-

TABLE 1

Analysis of Polygraphic Recordings

Date	4/10	4/24	5/1	5/8	5/13	5/16	7/15
Duration of abreaction	2′	2′	1′10″	1′	1′	1′	1′
Maximum respiratory rate, during abreaction	36/min.	39/min.	18/min.	24/min.	24/min.	24/min.	27/min.
No. of GSR waves during abreaction	16	16	6	9	1	0	3
Initial heart rate (20 sec. average)	81/min.	72/min.	90/min.	87/min.	87/min.	93/min.	81/min.
Maximum heart rate during abreaction	100/min.	120/min.	95/min.	100/min.	100/min.	105/min.	90/min.
Frontalis muscle activity during abreaction	Moderate	Moderate	Slight	Very Slight	Very Slight	Slight	Slight
Cheek temperature during abreaction	Fall	(Toe Temp.) Fall	No Change	No Change	No Change	No Change	No Change
Bed movement during abreaction	Moderate	Marked	None	None	None	Very Slight	Slight

graphic reactivity despite the decrease in activity shown by the repeatedly abreacted incident.

From the data in Table 1 it will be noted that with repetition of the abreaction its duration shortened from two minutes to a fairly consistent one minute. The respirations changed from a maximum of 39 per minute to 24 per minute with a return to 27 per minute after a two months' lapse. The number of GSR waves went from a maximum of 16 to a minimum of none and after a two month period back to three. The difference between the initial heart rate and the maximum heart rate showed a more variable course. The largest differential was 48 beats per minute in the second session. In the following sessions it showed a variable decrease and did not show any increase after the two months lapse of time, the final figure being a differential of nine beats per minute. The initial two sessions showed a significant amount of frontalis muscle activity, a fall in skin temperature, and marked evidence of total body movement. After the first two sessions these three factors decreased markedly and showed no essential change thereafter. Figures 1 and 2 show the appearance of the polygraphic recording of the early abreaction of 4/24 and the appearance of the polygraphic recording of 5/16 after "extinction."

Clinical observation of the subject during these abreactions showed a general decrease in the external indications of affect, as indicated principally by facial expression. However, the observed decrease of affective expression showed a less marked decrease than did the polygraph recordings. This may have been due to some effort on the part of the hypnotic subject to play the role that she thought the hypnotist desired.

DISCUSSION

In this subject there is a dimunition of the affective and autonomic responsivity which can be recalled from a specific traumatic incident. This decrease becomes more marked with repeated abreactions. This does not seem to be due to a general exhaustion of affectual or autonomic responsiveness of the subject, as the subject remained as responsive as originally to abreaction of newly recalled previous trauma. The variation of the degree of change in the variously recorded indices is in accord with the known ability of the fractionation of autonomic nervous system responses to emotional discharges (6). The partial return of the abreaction to the greater reactivity noted in the recording of

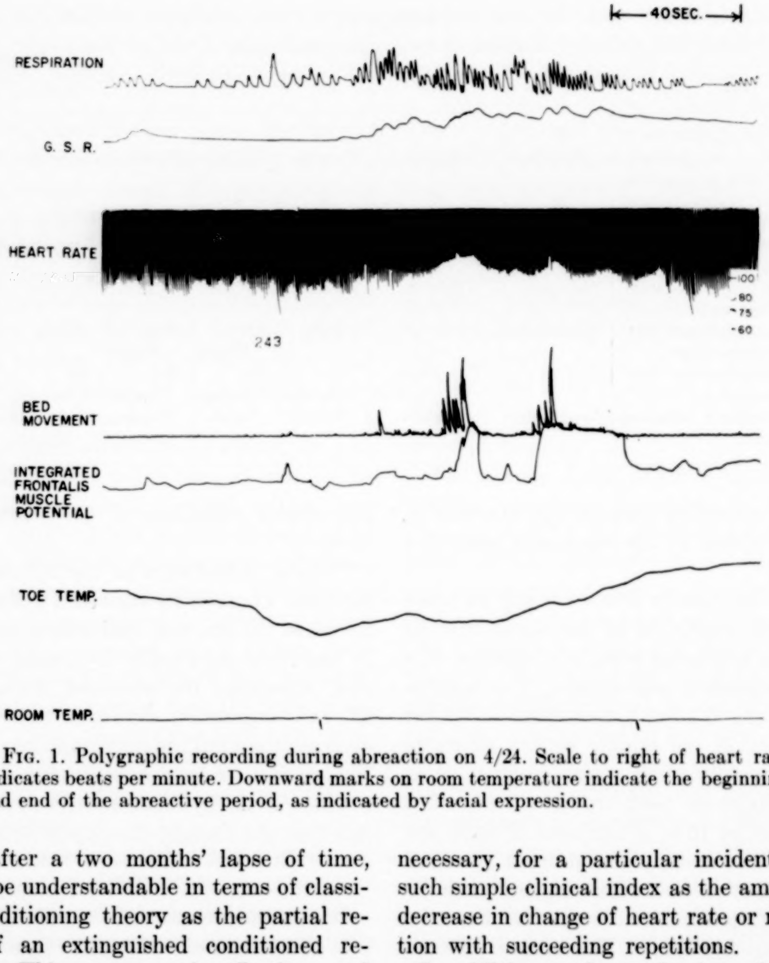

FIG. 1. Polygraphic recording during abreaction on 4/24. Scale to right of heart rate indicates beats per minute. Downward marks on room temperature indicate the beginning and end of the abreactive period, as indicated by facial expression.

7/15, after a two months' lapse of time, would be understandable in terms of classical conditioning theory as the partial return of an extinguished conditioned response. This return of affective and autonomic responsivity to a higher level after an initial lowering may account for the emphasis placed by many authors on necessity for a further waking "handling" of abreactive material in order to affect a permanent result. In general, it may be said that the results of this experiment are in agreement with the original hypothesis.

The above findings lead us to speculate that in illnesses such as acute traumatic neuroses, where abreaction is deemed to be of value, it might be worth while to use as an index of the number of abreactions necessary, for a particular incident, some such simple clinical index as the amount of decrease in change of heart rate or respiration with succeeding repetitions.

In addition to the mechanism of extinction it might be that there is a second factor involved in the benefits of abreactive therapies which is more non-specific in nature and which depends on an extreme emotional discharge. This would be consistent with Sargant and Shorvon's feelings that a stage of ultraparadoxical cortical inhibition must be reached and would also be consistent with the clinical observation as recorded by May (17), "that after a period of severe anxiety there is a respite for a time despite the fact that the underlying conflict is not radically clarified."

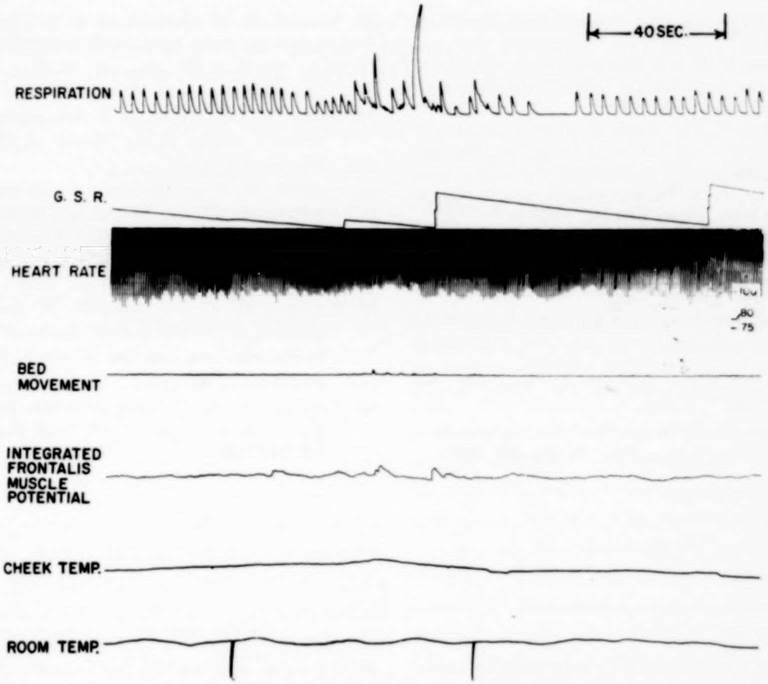

Fig. 2. Polygraphic recording during abreaction on 5/16. Sharp rises on the G.S.R. recording are artifacts caused by raising the recording pen to keep it on scale.

SUMMARY

An hypothesis has been formulated that the abreaction, as produced in hypnosis, is a type of conditioned response and as such should follow the general rules which apply to conditioning and extinction. An experiment has been performed in which a specific, hypnotically induced abreaction was repeated seven times in a clinically normal subject. It is noted from polygraph recordings of respiration, GSR, heart rate, frontalis muscle activity, cheek temperature, and body movement that there is a general decrease in autonomic and affective reactivity with succeeding repetitions and that if sufficient time is permitted to elapse between abreactions there is a tendency toward the return of autonomic and affective reactivity. These results are taken to be in agreement with the hypothesis that an abreaction may be considered as a form of elicited conditioned response.

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THE PRECIPITATION OF SEIZURES BY PHOTIC STIMULATION IN A PATIENT WITH HYPOPARATHYROIDISM

SEYMOUR SOLOMON, M.D.[1] AND DAVID FINE, M.D.

INTRODUCTION

The occurrence of convulsive seizures in the course of untreated hypocalcemia is well known. In addition to spontaneous seizure activity, the patient herein reported manifested a marked clinical and electrical response to photic stimulation during periods of hypocalcemia. To our knowledge, this relationship of hypocalcemia and photic sensitivity has not been noted in the past.

CASE SUMMARY

The patient was a 49 year old, right handed, white female when she entered Montefiore Hospital on December 30, 1957, because of four convulsive seizures occurring in the preceding two months. The seizures were characterized by sudden loss of consciousness, twisting and grasping movements of the arms on three occasions, and clonic movements of all extremities with urinary incontinence on the other occasion. The seizures lasted approximately 20 minutes, followed by confusion for another 30 minutes and amnesia for the event. Since the fall of 1957 she had noted drying of her skin and thickening and deformity of her nails. During the same time her family had observed that she became neglectful of her appearance, suspicious and forgetful. In November 1957 "pins and needles" sensations in her hands and feet, intermittent "stiffening" in her arms and legs, and frequent leg cramps were noted. Four days prior to admission, during electroencephalography, a seizure was precipitated by photic stimulation. The seizure consisted of a myoclonic jerk followed by loss of consciousness and clonic movements of the extremities. There was no other significant history.

The pertinent physical findings were consistent with hypoparathyroidism. Trousseau's sign first appeared when routine blood pressure recording produced carpal spasm. Ichthyoid changes of the skin especially of the hands, and thickened, powdery, brittle nails were noted. Punctate anterior and posterior corneal opacities were found by the ophthalmologist. Neurologic evaluation showed the patient to be oriented to time and place but she was slightly drowsy and suspicious. She manifested a prolonged response time to questioning as well as impairment of calculation, and memory. The cranial nerves were normal except for the bilateral presence of Chvostek's sign. There was a fine resting tremor of the extremities without change in muscle tone. Fasciculations were noted in the right upper extremity. The deep reflexes were hyperactive with relatively greater increase in the left arm and the right leg. Sensation, gait and coordination were intact. The clinical diagnosis of hypoparathyroidism was established by the finding of hypocalcemia and hyperphosphatemia.

LABORATORY DATA

The routine urinalysis, blood count, blood urea nitrogen, blood creatinine, fasting blood sugar, blood serology, serum protein and albumin and globulin, and blood alkaline phosphatase were normal. The sedimentation rate was 58 mm. per hour. Serum calcium prior to therapy ranged from 4.6 to 7.5 mg. per 100 cc., averaging 5.7 mg. per 100 cc., (normal 9–11 mg. per 100 cc.) and the serum phosphorus from 3.6 to 7.0 mg. per 100 cc., averaging 5.9 mg. per 100 cc., (normal 3–5 mg. per 100 cc.). The Ellsworth-

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[1] Division of Neurology, Montefiore Hospital, New York 67, N. Y. The authors wish to thank Dr. Herta Spencer for the metabolic evaluations and Dr. Tiffany Lawyer, Jr. for his assistance in the development of this study.

Howard test (effect of administration of parathyroid hormone on serum and urinary calcium and phosphorus) was consistent with hypoparathyroidism. The radioactive iodine uptake and protein bound iodine were within normal limits. A lumbar puncture revealed normal initial pressure, cell count, protein, sugar and serology. The electrocardiogram exhibited a prolonged Q-T interval, a known feature of hypocalcemia. Skull roentgenograms were normal and did not show intracerebral calcification.

Early in the patient's hospital course three spontaneous grand mal seizures occurred. While metabolic evaluation was carried out, intermittent intravenous calcium gluconate was given and there were no further seizures. After nine weeks of hospitalization the patient was discharged on a daily oral regimen of 16 grams of calcium gluconate. On this therapy her serum calcium averaged 7.4 mg. per 100 cc. and serum phosphorus averaged 5.4 mg. per 100 cc. She became more alert and better able to perform daily tasks. Paresthesiae disappeared. The status of the skin and nails considerably improved. Neither tetanic phenomena nor seizures recurred. The levels of serum calcium and phosphorus during and after the initial hospitalization are plotted in Figure 1.

EEG STUDIES

The first EEG of 12/26/57 (Figures 2, 3) four days prior to admission revealed within a background pattern of 9–10 cycles per second, scattered 6–8 cycles per second activity as well as slower rhythms from all leads but with some left-sided predomi-

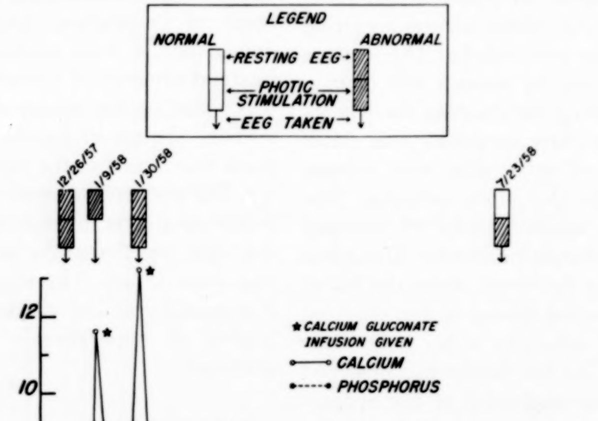

FIG. 1. Serum calcium and phosphorus values during and after initial hospitalization. There is an elevation of serum calcium and a decrease of serum phosphorus during oral calcium gluconate administration. The resting EEG became normal after 21 weeks of this therapy.

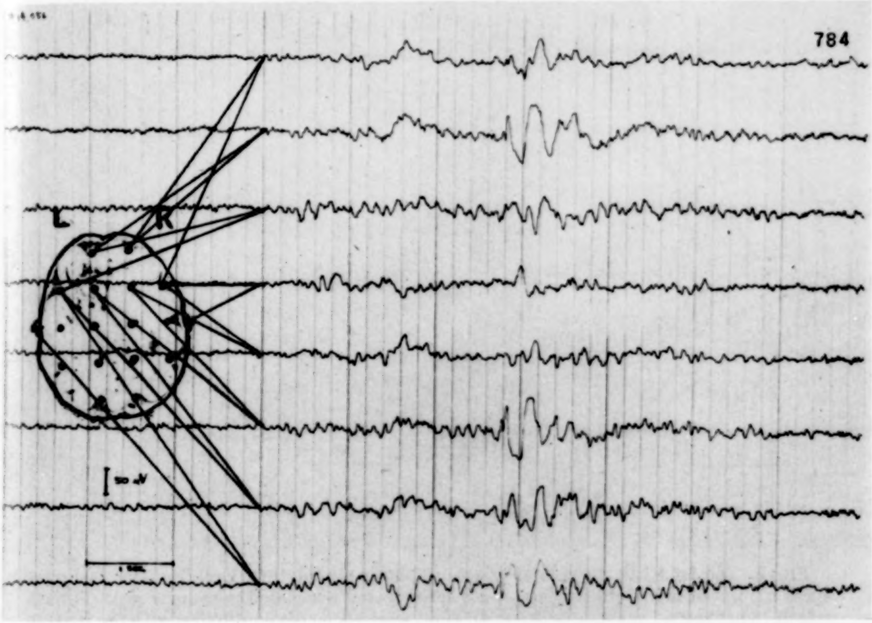

FIG. 2. The 1st EEG (12/26/57) four days prior to admission. Slow waves are seen within the record as well as rare paroxysmal activity.

nance. In addition random sharp waves were seen, again more prominently over the left hemisphere. Finally rare paroxysmal activity resembling an irregular spike and wave pattern was present emanating from all leads. Hyperventilation accentuated the slow activity. On photic stimulation each random flash produced a burst of high voltage multi-spike activity associated with a clinical myoclonic jerk. A series of 18 per second photic stimuli lasting less than one second produced a multi-spike pattern that became continuous with the electrical features of a clinical grand mal seizure. The second EEG of 1/9/58 revealed a slower background pattern of 6 cycles per second, but neither left-sided predominance nor sharp waves nor spike and wave patterns were seen. A four hour calcium gluconate infusion containing 470 mgm. of calcium caused Chvostek and Trousseau's signs to disappear and decreased the Q-T interval of the EKG but did not change the cerebral electrical activity. The third EEG of 1/30/58, taken after a calcium gluconate infusion, revealed a background pattern similar to the second record, but after two minutes of hyperventilation a paroxysmal series of irregular spike and wave activity occurred. The electrical and clinical response to photic stimulation was similar but less prominent than during the first record, *i.e.*, a grand mal seizure did not occur. The fourth EEG of 7/23/58 (Figure 4), taken 21 weeks after discharge on calcium gluconate therapy, revealed a normal resting EEG but the clinical and electrical response to photic stimulation had not significantly changed. On 11/19/58 the patient was readmitted for further evaluation of her calcium metabolism. The fifth EEG of 12/4/58 was similar to the fourth. On 12/15/58, in addition to oral calcium therapy, parathyroid hormone (200 units per day) was administered and this regimen was continued for 24 days. The levels of serum calcium and phosphorus before, during, and

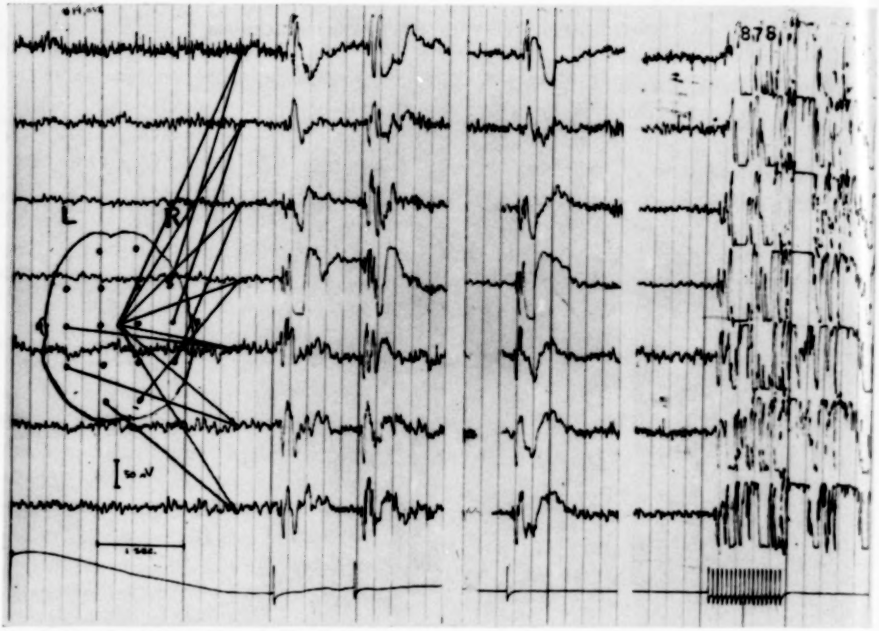

FIG. 3. The 1st EEG (12/26/57). Effects of photic stimulation. Each random flash produces a burst of high voltage multi-spike activity and associated myoclonic jerks. A flash rate of 18 per second causes a multi-spike burst which becomes continuous with the pattern of a grand mal seizure.

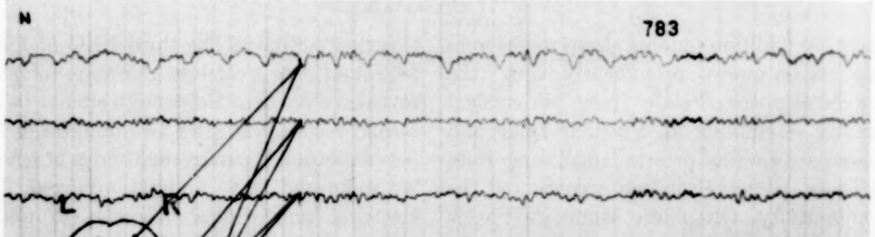

FIG. 4. The 4th EEG (7/23/58). After 21 weeks of oral calcium gluconate the resting EEG has become normal.

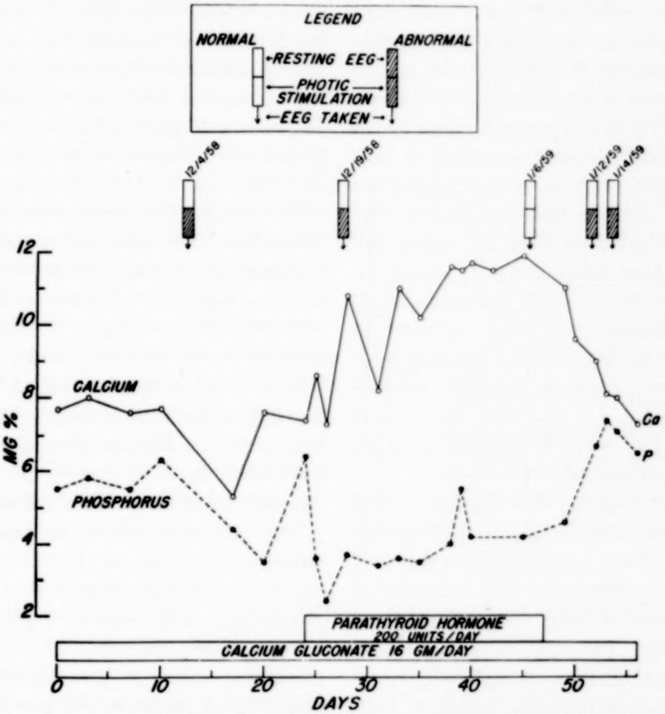

FIG. 5. Serum calcium and phosphorus values related to parathyroid hormone administration. The serum calcium is strikingly elevated and the phosphorus depressed. After three weeks of hormone therapy an abnormal response to photic stimulation no longer occurs.

after parathyroid hormone therapy are plotted in Figure 5. The sixth record, of 12/19/58, was similar to the two immediately preceding but the electrical response to photic stimulation was only occasionally abnormal and there was no associated clinical response. The seventh record of 1/7/59 was normal both in the resting state and in the response to photic stimulation. The serum calcium had returned to normal. On 1/7/59 parathyroid hormone was discontinued and serum calcium subsequently dropped to low levels. Both the eighth and ninth records of 1/12/59 and 1/14/59 revealed normal resting activity but the electrical responses to photic stimulation were again abnormal and a myoclonic clinical response was associated with 10 per second flash. This degree of response was similar to that obtained in the third, fourth and fifth records.

The cause of this patient's hypocalcemia was not anatomically established, but in view of her response to parathyroid hormone, idiopathic hypoparathyroidism is the most likely diagnosis.

DISCUSSION

Convulsive seizures were the first clinical manifestations of hypocalcemia in this patient. That seizures may be the only symptoms of hypocalcemia and may occur long before other signs of the disease is well known. Although grand mal seizures are most common, other types of convulsive phenomena, both focal (10, 12) and minor seizures (1) have been described. There had been sporadic reports of EEG findings in cases of seizures associated with hypocalcemia, (1, 5) but the first large series were reported by Odoriz, *et al.*, (8) and Gotta and Odoriz (3). The above as well as subsequent studies (4, 12) failed to reveal a consistent electroencephalographic pattern. In patients who have seizures the interseizure record may be normal (9) or it may reveal abnormalities manifested as bursts of slow waves and spikes, slow activity occurring at random or in series, or "continuous generalized dysrhythmia" (3). It has been shown that an exact correlation between the serum calcium level and the EEG does not exist (3, 4). Although symptoms may disappear when the blood calcium is quickly elevated to normal levels by intravenous calcium infusion, significant change in the EEG pattern is not immediate. On the other hand, long term therapy has resulted in reversion of the EEG to normal and seizure control.

This case exemplifies the changes in the EEG associated with changes in the hypocalcemic state. When hypocalcemia was first discovered and presumably had been present for a long period of time, the resting record revealed diffuse theta activity, increased prominence of slow waves over the left hemisphere, and rare paroxysmal bursts of high voltage irregular spike and slow wave activity emanating from all leads with slight left-sided predominance. As the hypocalcemic condition was partially corrected the resting EEG revealed diffuse 6 cycles per second slow activity without the unilateral predominance, sharp waves, or paroxysmal features. The diffuse slow wave abnormality persisted when the hypocalcemic state was corrected by intravenous calcium gluconate. With the maintenance of serum calcium to levels of approximately 7 mg. per 100 cc. by oral calcium gluconate the resting record after four months was found to be normal. When (after the cessation of parathormone therapy) serum calcium was allowed to drop from 12 to 8 mg. per 100 cc. during a relatively short period of time, significant change in the normal resting record did not occur.

Several reports (3, 4, 9, 10) have noted the effect of stimulation techniques on the EEG's of patients with hypocalcemia. An accentuation of the EEG abnormality or the production of marked slow wave changes after a normal resting record have been noted in association with hyperventilation. This response to hyperventilation was not usually found after long term treatment of hypocalcemia. Grant (4) used photic stimulation with leptazol but only after the hypocalcemia had been corrected and the EEG had returned to normal. Under these circumstances, significant difference from normal responses was not found. Robinson *et al.* (9) used the same combination in a patient with seizures and a normal resting record, and was able to provoke a seizure. We have been unable to find EEG studies in patients with hypocalcemia using photic stimulation without simultaneous metrazol administration.

The results of photic stimulation in our patient were dramatic. In the initial record, when hypocalcemia was present but not yet recognized, each random flash produced a burst of high voltage multi-spike activity associated with a generalized myoclonic response. A series of 18 per second flash for less than one second produced a grand mal seizure. While the patient was still hypocalcemic, elevation of serum calcium by infusion of calcium gluconate failed to prevent the marked response to photic stimulation although the degree of response was not as severe as during the first examination. After the patient had been treated with oral calcium gluconate for 21 weeks, the resting record had reverted to normal, but the response to photic stimulation was still abnormal. It was only after achieving normal levels during a three week course of parathyroid hormone in conjunction with oral calcium gluconate, that the response to photic stimulation became normal. Within five days following cessation of parathyroid hormone, and associated with a drop in serum calcium, the abnormal response to photic stimulation returned, although the resting EEG remained normal.

The relationship of hypocalcemia to

changes in the resting EEG and to photic stimulation is obscure. Certainly a direct relationship between levels of serum calcium and EEG changes does not exist, but prolonged hypocalcemia will ultimately produce abnormality in the resting EEG and prolonged improvement in calcium levels will reduce or abolish the electrical abnormality. Similarly, serum calcium levels were not directly correlated with photic sensitivity in our case, for sensitivity persisted during intravenous calcium infusion. Yet abnormal response to photic stimulation diminished and disappeared after serum calcium was maintained at near normal levels and photic sensitivity returned, in the presence of a normal resting EEG, after serum calcium level was allowed to drop. We believe that the duration of the level of serum calcium is a very important factor in the development of changes in the resting EEG and the occurrence of photic sensitivity.

Factors other than serum calcium have been shown to play a significant role in the cerebral response to hypoparathyroidism. Increased hydration of the brain in experimental hypoparathyroidism was noted by Ellis (2). McQuarrie *et al.* (7) believed that the essential factor in convulsive seizures of hypoparathyroidism was the disturbance in surface functions of the brain cell membranes associated with excess cerebral hydration. There may be other effects of hypoparathyroidism that contribute to the changes in the central nervous system (6). The exact interrelationship of the above factors remains speculative. Since convulsive phenomena are relatively rare manifestations of hypoparathyroidism, basic constitutional factors must be invoked. Thus the threshold of convulsibility associated with hypocalcemia varies from one individual to another and varies with different stimuli. Whether other patients with hypoparathyroidism and hypocalcemia are sensitive to photic stimulation will have to be determined by further study.

SUMMARY

A 49 year old female developed grand mal seizures associated with hypocalcemia due to idiopathic hypoparathyroidism. Her initial resting EEG was abnormal and photic stimulation produced multi-spike activity associated with myoclonic jerks as well as a grand mal seizure. Acute elevations of serum calcium had no effect upon the EEG. Prolonged improvement of serum calcium caused the resting EEG to revert to normal but photic sensitivity persisted. Further elevation of serum calcium by parathyroid hormone therapy abolished photic sensitivity and the latter returned when the serum calcium was allowed to drop to lower levels. Only prolonged improvement of the hypocalcemic state abolished the EEG abnormality and the photic sensitivity.

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BOOK REVIEWS

Boss, Medard. *The Analysis of Dreams.* Philosophical Library, New York, 1958. 223 pp. $6.00

The author of this book is Professor of Psychotherapy at the University of Zurich. In the preface he describes himself as a "psycho-analytical therapist, who, in 25 years of practice, has heard about 50,000 dreams of about 500 different people." After "years of training in classical psychoanalytic theory and practice, such as is required by the Freudian school," he encountered dreams which yielded only with great difficulty to the key of Freudian dream theory, and therefore the whole theory seemed to him inadequate. He therefore turned to the works of others, especially C. G. Jung, A. Maeder, H. Silberer, A. Adler and W. Stekel, but he felt that the essence of the phenomenon was not clarified by them either, for they all agreed with Freud in replacing the direct phenomenon by explanation of it, by some mental construct assumed to exist behind it. Chiefly through contact with the existentialist approach of Heidegger and Binswanger, the author attempted "the daring task" of the direct study of the dream phenomenon itself.

All this sounds most promising, but what this reviewer found was—in the first portion of the book—a most erudite review of the writings of the above-mentioned authors, interesting and detailed, but unhappily invalidated by major shortcomings. For these reviews of the work of others are all presented in a highly polemical fashion, as though attempting to expose their weaknesses in comparison with what the author will present instead. Assuredly there is nothing exclusive or even conflictual between trying to interpret dreams and trying to describe them phenomenologically. Yet the author seems to attack all this previous work directed to the study of dynamics and interpretations of dreams. Setting up such an opposition to all previous work, rather than building upon it, introduces a tendentiousness, a bias against the contributions of these authors which vitiates the sympathetic understanding of them and the accuracy and reliability of the presentations, for certain essentials are missed. As a single example, Freud stated explicitly in his "Outline of Psychoanalysis" that dreams can come from the Ego as well as the Id, and the role of the Ego in the total personality and in psychic functioning has been extensively studied by psychoanalysts for nearly three decades. Yet these considerations are entirely by-passed, even though they bear directly upon the author's own thesis of the operation of the ego in dreams.

Following these polemical reviews, which do not properly present and evaluate these studies of the nature of the dreams, the forces which form them, and methods of interpretation; what the author has to present is little more, as this reviewer understands it, than a descriptive statement of different kinds of dreams, and of certain experiences and ego functions seen in them. As examples of the "Dreamer's Possibilities of Existing" in dreams, the author presents dreams which illustrate anxiety, volition, reflection, moral evaluation, artistic appreciation, etc.—all ego functions which are neither newly recognized nor further illumined, nor even so well understood as by the concept of the ego being partially awake and partially functioning as it reacts to the scenes of a dream. Who doubts that we each "exist" in our dreams, that we have experiences of all sorts in dreams, and that we feel, think and respond in many ways? It is difficult to see what this particular existentialist approach adds.

Knowing what time and labor go into writing a learned book such as this, it is most unpleasant to come to the conclusion that neither its reviews and critiques of previous studies nor its phenomenological descriptions contribute substantially to the subject.

Leon J. Saul

Davies, Stanley Powell. *The Mentally Retarded in Society.* Columbia University Press, New York, 1959. 248 pp. $5.50

"This volume endeavors to present mental retardation in its social rather than its clinical aspects. It aims to show how various phases of public opinion and action have followed the evaluation of scientific knowledge. The more recent trends of thought and action are particularly dealt with as indicating what a modern mental deficiency program might comprise." The first section of this book is concerned with historical background while the second, and larger, section concerns the different aspects of the rehabilitation process.

This book is partially successful in giving a broad overview of the social aspects of mental retardation. This reviewer can only say "partially successful" because it is not clear to him for what audience this book is intended. To the professional person who already has an interest in mental subnormality, this book has little to offer. Although each chapter is concerned with an important problem the treatment is superficial and, in fact, is misleading at times about the scientific basis for some of our practices. For example, Dr. Davies discusses special classes as if there is no doubt that they are better for the subnormal child than a regular class experience. This reviewer is not aware of any clear-cut scientific basis for such an assumption. While this assumption is probably accepted by most educators, it would be recognized by most that the special class is not an unmixed blessing. The failure to discuss critically problems, practices, and recommended programs dilutes considerably the value of this book for the professional person. To the layman, however, this book would be of value in giving him an overview of some of the applied or service aspects of mental subnormality.

Clarke, Ann M. and Clarke, A. D. B., Eds. *Mental Deficiency.* The Free Press, Glencoe, 1958. 513 pp. $10.00

Workers in the field of mental subnormality have long been aware that our British colleagues have made some of the most substantial contributions to this field. Although it is true, as the Clarkes state in the foreword, that "traditionally mental deficiency has been a neglected field of study," this situation applies more to America than to Britain. The book, under review, supports this opinion.

The contributors to this volume are Tizad, O'Connor, Ann Clarke, A. D. B. Clarke, Elspeth Stephen, Ginzburg, and Margaret Penwill. The majority of these people are recognized research contributors to the field and it is not surprising, therefore, that the average quality of the eighteen chapters is well above what one ordinarily finds in a multi-authored book. The scope of the volume is indeed broad and includes, in addition to the usual topics, thoughtful discussions and critical reviews of such problems as the abilities and trainability of imbeciles, speech disorders and therapy, longitudinal and follow-up studies, and adoption and fostering of children of the mentally deficient.

In the foreword the Clarkes state, "In the present volume we have three main aims: first, to summarize as comprehensively as possible the literature on psychological and social aspects of mental deficiency (particularly that of the last decade) against a background of genetics and neuropathology. Second, we have tried to show the intimate, reciprocal and enriching relationship between theory and practice, and the use of experimental method in both areas; and third, an attempt has been made to indicate in a practical manner how the learning difficulties and social problems posed by the subnormal may be ameliorated." These aims are admirably achieved.

There are many different kinds of specialists who get involved in problems of mental subnormality although the narrowness of their training obscures for them the complexity of the social-psychological aspects of these problems. The typical training of psychiatrists, neurologists, pediatricians, etc., not only prevents them from seeing the social-psychological complexities in a case of subnormality but also limits the degree of real help which they can offer to the child, his family and the community. This book could be read very profitably by such specialists. It is also a book which has a real place in advanced courses in psychology and education. It is a virtue of this book that it is not a "text" in the ordinary sense of that word. It is a reference book which should be in the library of everyone who is presently engaged in work with the mentally subnormal.

Seymour B. Sarason

ILLINGSWORTH, R. S., ED. *Recent Advances in Cerebral Palsy.* Little, Brown and Co., Boston, 1958. 389 pp., illus. $12.00

This volume is edited by the Professor of Child Health at the University of Sheffield, and includes contributors from the United States and Australia as well as the United Kingdom. The editor discusses etiology, diagnosis, classification and, in general, presents the problem of the cerebral palsied child. The other contributors discuss treatment in its various aspects; psychological, physical therapy, drug, orthopedic and neurosurgical. Treatment of deafness and speech therapy in these handicapped children is also discussed. The voluntary and governmental agencies created to deal with this problem in the United Kingdom are reviewed and described at some length. Included at the end of the volume is a supplement by S. A. Messner, of the United Cerebral Palsy Association, which summarizes the voluntary and tax-supported services in the United States for cerebral palsied individuals. Dr. C. B. Courville has contributed a very interesting chapter on the neuropathology of these various conditions.

This volume will be of greatest interest to pediatricians, neurologists, and other physicians who are not directly concerned with treatment in this difficult field. The book contains a good summary of recent efforts and thinking of the people who have undertaken intensive investigations in this area. The numerous contributors from diverse fields of specialization point up clearly the necessity of the team approach in management and treatment of patients with cerebral palsy.

The volume is well illustrated. The index is quite short and appears to have limited usefulness. However, each chapter includes a bibliography, seemingly quite complete, which should facilitate obtaining further information.

WOODS, G. E. *Cerebral Palsy in Childhood.* John Wright and Sons, Ltd., Bristol, 1957. xi + 158 pp. $6.50

This small volume is an account and analysis of 301 children seen at the Bristol Children's Hospital, in whom a diagnosis of "cerebral palsy" was made. Since the chief reason for referral of these children to this clinic was to assess their educability, most of the children in this series are five years of age or over. For convenience, the cases have been classified into seven groups, including those children with paraplegia, monoplegia, hemiplegia, quadriplegia, athetosis, ataxia, and rigidity. A chapter has been devoted to each type and additional chapters have been included to deal with visual defects, auditory and speech defects, sensory defects and convulsive disorders found in these children. In general, each chapter includes a brief clinical consideration of the one type of the disease and a consideration of the various etiologies involved in the series.

The volume is well illustrated and has a complete and useful index. There is one chapter devoted to a brief review of the English literature on this subject, with an appropriate bibliography at the end of the book.

This book is of interest chiefly to those physicians dealing with cerebral palsy problems, and they will benefit from and enjoy learning of the experience of another group of workers dealing with the same problem. This reader does not believe that it was intended for any other purpose. The brevity of the volume and its relative restriction to clinical and statistical considerations tend to limit its usefulness to a smaller group of readers.

SCHRAPPE, O. *Die Atiologische und pathogenetische Bedeutung nicht-endogener Factoren fur die Schizophrenie.* Georg Thieme Verlag, Stuttgart, 1959. viii + 82 pages, DM 12.60

This monograph is one in a series of writings on social medicine and is concerned with the criteria for evaluation of "exogenous factors" in schizophrenia. The term "exogenous" or as the author prefers, "non-endogenous," is used in the rather narrow sense of precipitating physical, social or emotional stress. The principal value of this study is seen in a careful review of the present-day concepts of schizophrenia as well as in the painstaking and conscientious manner in which available information is applied to certification of psychiatric invalidism.

Dr. Schrappe concludes that no proof exists to consider environmental factors as relevant for those forms of schizophrenia which terminate in "defect" formation. His statement is qualified by an unequivocal commitment about the definition of schizophrenia. He separates his concept of schizophrenia from those syndromes which may appear to be schizophrenic in symptomatology but have a tendency to remission or restitution on a premorbid level.

It is evident that such a delineation of the entity schizophrenia will tend to be weighted in favor of hereditary and constitutional predisposition rather than schizophrenic life experiences of an individual. In the face of much empirical and perhaps at times anecdotal knowledge as it is derived from psychotherapeutic work with schizophrenics, the author's viewpoint may seem as rigid to us as it might be refreshing to others. The book is well documented and annotated. It should be of interest to psychiatrists engaged in rehabilitational and industrial medicine.

Klaus W. Berblinger

TOMPKINS, SILVAN S. AND MINER, JOHN B. *PAT Interpretation: Scope and Technique.* Springer Publishing Co., New York, 1959. 184 pp. $5.50

The PAT is a projective test combining features of the Thematic Apperception Test (TAT) and the Picture Arrangement subtest of the Wechsler Scales. There are 25 plates of three scenes each. The subject designates the order in which the scenes should be arranged in his judgment, and writes a brief story around the arrangement. The commonality or infrequency of specific orderings are determined by a comparison with carefully developed standards. Normative tables are broken down in accordance with age, intelligence, and education.

PAT Interpretation is a workbook designed to supplement the instructions in the authors' earlier publication, *The Tompkins-Horn Picture Arrangement Test.* The present volume is essentially an exercise book, attempting to substitute, insofar as possible, for the direct instruction presented by the authors in several workshops. The reader is taken step by step through the mechanics of scoring one protocol and then accompanies the authors along the complex path of reasoning toward interpretation.

A demonstration of such directed thinking, including consideration of possibilities, hypotheses, exceptions, rejections, acceptances, and eventual conclusions makes for informative but sometimes tiresome reading. The book is thus suitable only as a text for those clinicians who intend to use this particular instrument regularly. For more general information regarding the development and rationale of the test, it is necessary to refer to the earlier publication.

The scoring of the responses, as described, appears to be a lengthy and complicated procedure. While it is possibly true that this can be performed by clerical help, the assumption that such services are available suggests that the test was designed for use in industry rather than in clinical or hospital settings. The content of the plates supports this impression. Thirteen of the 25 deal directly with a work situation. A female figure appears in only three of the plates, a child in only one. This specialization could have the effect of limiting the applicability of the test.

It is interesting to note that male and female norms are interchangeable. This is somewhat surprising in view of common TAT experience. It seems likely that this equivalence would be due to limited alternatives rather than to the test's generality.

The results presented in the text also support the impression of specialized application. While the process of interpretation is amply illustrated, no example of a report based on a PAT protocol is given. An attempt to extract the significant psychological statements imbedded in the description of the interpretative process leads one reluctantly to the conclusion that the amount of information developed in these interpretations is small considering the effort and time expended.

As an enterprise in creative research, the development of the PAT is a noteworthy accomplishment. The format of the test is clever and interesting; the rationale, in this reviewer's opinion, brilliant; the standardization meticulous. From the point of view of the practicing clinical psychologist or psychiatrist, it does not, in its present form, seem to constitute an efficient addition to the clinical armamentarium.

Irvin Greenberg

Penfield, Wilder and Roberts, Lamar. *Speech and Brain Mechanisms*. Princeton University Press, Princeton, 1959. xiii + 286 pp., illus. $6.00

This is a unique and valuablé contribution to our knowledge of cerebral function and speech. Chapter I, in an introduction with discussion of mind and consciousness, stresses that the brain is the organ of the mind. There follows a fine historical account of the development of cerebral localization of function and of centrencephalic integration.

The third chapter is devoted to the recording of consciousness and the function of the interpretive cortex. Here Penfield is clearly at his best as he discusses experimental as well as interpretive consciousness.

The fourth chapter, by Roberts, exhaustively analyzes the literature on aphasia, agnosia and apraxia. In a later section he presents a special study of the sodium amytal aphasia test and disturbances of speech with seizures.

The volume also includes a review and discussion of the problem of handedness and cerebral dominance, a fine account by Penfield on mapping the speech area, and two chapters by Roberts on the evidence from cortical mapping. There is an epilogue on language and learning, a most complete bibliography and two useful indexes (one given for the cases presented).

This is a carefully written and well edited book which, in the reviewer's opinion, will be found indispensable for practising neurologists.

J. M. Nielsen

Conrad, K. *Die beginnende Schizophrenie*. Georg Thieme Verlag, Stuttgart, 1958. vii + 165 pp. $4.50

K. Conrad, one of Germany's outstanding psychiatrists, has written an interesting monograph about the clinical manifestations of early schizophrenia. The patients on which Conrad's research is based are soldiers of the Wehrmacht. Relative uniformity of the social milieu and psychological experiences which are accessible to verification and exploration qualify these patients for such a study. Conrad describes so-called *Trema* (the Greek word for stage fright), a state of psychological tension, as the initial experience. It is followed by experiences of a change in meaning which Conrad calls *Apophany* (Greek for revelation) because of their, for the patient, compelling and convincing nature. At the same time the patient experiences being the center of all events which Conrad terms *Anastrophy.* Schizophrenic hallucinations and delusions, delusions of sensitivity, reading of thoughts "Gedankenlautwerden" and other elementary symptoms of classical psychopathology are all interpreted in terms of these basic concepts. Conrad also describes the course of illness in his schizophrenic patients, progressing from trema to apophany and anastrophy and then to apocalyptic disintegration or to consolidation with or without residual symptoms. Depending on the severity of the case he distinguishes seven types of schizophrenia.

The author differentiates his "psychological analysis" from existentialist-analytic approaches, and from an organic orientation; the latter, however, is not incompatible with the present approach. Conrad's indebtedness to Jaspers, Ludwig Binswanger and particularly to Kurt Lewin are stated. The strength of this book, however, does not lie in original conceptualization but more in orderly and relevant clinical description. This makes the material more alive than a classical psychopathological approach would permit and also clearer and more scientific than existentialists' writings on this subject.

This is an honest book, not promising more than it pretends to be: an economic and straightforward psychological description of schizophrenic patients without any pretense of etiological explanation.

Elsa A. Redlich

HARROWER, MOLLY. *Personality Change and Development as Measured by the Projective Techniques.* Grune and Stratton, New York, **1958. 383** pp., illus. **$10.00**

Certainly the author of this book needs no introduction to an audience familiar, even to a minimal degree, with projective technique literature. As in the case of previous publications, Dr. Harrower has been painstakingly careful in the formulation of the questions she considers, her definition of terms, the selection and presentation of the illustrative test material, and the answers she offers.

The author describes the basic purpose of the present volume, the first of two, as "an attempt to utilize the formidable mass of raw test material available after fifteen years of testing with an extensive battery," in a comparison of differences between first and second test performances, as well as in the comparison of these test differences with other available assessments of the patient. Somewhat more specifically, two of the questions raised, and subsequently answered, are as follows. 1) To what extent does the projective test material mirror the reported change in behavioral adjustment and in subjective experience? 2) What are the similarities or differences between changes brought about by growth and life circumstances and those associated with various forms of successful psychotherapy?

The introductory chapters include a review of the literature on retesting and descriptions of the two rating scales for measurement of change, *i.e.* according to the test findings and according to the therapist's findings. More than three-fourths of the book is devoted to individual cases, categorized primarily in terms of the conditions of the retesting. Thus we have, among others, chapters on retesting after: minimal time intervals; 30 days; one year; a sudden cessation of acute stress; gradual reduction in stress; long-term analytic therapy; long-term psychotherapy; brief psychotherapy, successful; brief psychotherapy, unsuccessful; and a therapeutic change in environmental conditions.

With the exception of those sections concerned with a lapse of a specified time interval, in which test records are reproduced verbatim and discussion is focused on test differences, the general format followed in each chapter provides clinical data, comments on the tests, and comments on the two measurement of change scales. When test findings and therapist's findings appear discrepant initially, supplementary details are given. While the majority of the cases had been given a seven-test battery which included the Wechsler-Bellevue verbal scale, the Rorschach, Szondi, Figure Drawings, Holsopple-Miale Sentence Completion test, Most Unpleasant Concept test and a short form or a few selected pictures from the TAT, obviously complete reproduction of all test material would have been impractical. In most instances the basic test data routinely presented, for both first and second administrations, include: equivalent weighted scores on the Wechsler-Bellevue verbal sub-tests and verbal IQ; the Szondi profile, one administration; the Figure Drawings; Rorschach summary of areas and determinants; and the two rating scales of change. Occasionally, for an individual subject, other illustrative material from Rorschach content, incomplete sentences, or one or two TAT stories have been given.

Two limitations of the present work should be mentioned. First, the vast majority of the cases score in the verbal IQ range above 120. Second, the intermittent selective inclusion of test content, as Sentence Completions, TAT stories, or Most Unpleasant Concepts, can become somewhat frustrating to the reader.

In summary, Dr. Harrower presents the following conclusions. 1) When clinical improvement is reported, some measure of positive change is invariably shown in the projective tests; when clinical changes occur in the direction of increased disturbance, the projective materials present increased evidence of emotional disintegration. 2) The changes which occur in the projectives without psychotherapeutic intervention do not differ significantly from those associated with a therapeutic process. 3) A projective battery appears to offer a reasonably reliable means of assessing some aspects of personality changes.

As illustrative of the changes in test findings which parallel clinical improvement, the author lists, among others: 1) a general rise in IQ; 2) dropping out of pure C responses, F− responses, and bizarre answers in the Rorschach; 3) enriching and maturing of the self-concept as reflected in the qualitative aspects of the Rorschach M responses; 4) appearance of or increase in FC responses in the Rorschach; 5) a change in the level of the Figure Drawings; 6) enriching of TAT stories and reflection of a more mature social attitude in the Sentence Completion; and 7) a change in Szondi profile in which one area is conspicuously loaded to a more balanced one.

Personality Change and Development is not a publication to be recommended for a one-time quick reading; rather, it is an excellent reference book which most clinicians, regardless of the amount of direct work with the projectives, will want within easy access on their own library shelf.

Claire M. Vernier

PFEFFER, ARNOLD Z. *Alcoholism.* Grune and Stratton, New York, 1958. xii + 97 pp. $6.50

This is a slender, compact book written by the Director of the Consultation Clinic for Alcoholism at the University Hospital of the New York University-Bellevue Medical Center, and sponsored in 1952 by the Consolidated Edison Company of New York.

The book is one of the *Modern Mono-*

graphs in Industrial Medicine, and, although comprehensive in its review of the entire field of alcoholism, is most valuable because of its emphasis upon alcoholism in industry.

Dr. Pfeffer, after devoting chapters to consideration of alcoholism as a disease, the management of the medical complications in alcoholism, the management of the neuropsychiatric complications of alcoholism, the psychology of alcoholism, the psychological treatment for alcoholism, and the adjunctive treatments such as hospitalization, Antabuse, and the aversion techniques, comes to what, the reviewer feels, is the most valuable part of the book; namely, the description of the program developed by the Consolidated Edison Company of New York for the detection and treatment of alcoholic employees.

The book also describes other industrial programs, and is very useful in its succinct report of the Yale Plan, The National Council on Alcoholism, Alcoholics Anonymous, and Portal House.

The great merit of this publication lies in the clarity of thinking, and the brief and economic survey of the essential aspects of alcoholism.

All those who have dealt with alcoholics are aware that one of the most serious obstacles in so many instances is the lack of motivation on the part of the alcoholic to seek help in achieving and sustaining sobriety. An appalling phenomonon is the denial of the alcoholic that he has a drinking problem and refusal to realize that he is in serious need of assistance. The reasons for this denial are many. Drinking is a socially accepted practice in our country and permeates much of social life. To the average person who has a drinking problem, acknowledging this implies being an outsider, inferior, and a sacrifice of camaraderie. Too many people still visualize the alcoholic as a derelict totally bankrupt emotionally, physically, economically, and socially. The hidden alcoholic—the alcoholic in the less severe phase of this illness—strenuously resists being identified with this skid-row variety.

With our present understanding of alcoholism, we know that the only possible plan in coping with alcoholism is the adoption of a program of total, sustained abstinence. Controlled drinking is not possible for the alcoholic, and is the essence of his illness. It is this which causes the average alcoholic to balk at recognizing and acknowledging his alcoholism and to enter conscientiously into the only possible solution, unswerving sobriety.

Many alcoholics, out of pride, resentment, and unwillingness to accept their limitations with respect to alcoholism, blandly or vigorously deny having this illness. Unfortunately, too many have to be driven to despair after having sacrificed most of the important values of life before reaching a psychological state permitting them to forego drinking altogether.

It seems to me that one of the greatest problems physicians face is that of stimulating motivation in the alcoholic to stop drinking. Industry is in a very crucial position to accomplish this. It has the opportunity both to provide motivation for sustained sobriety because of the importance of the job to the individual, and to accompany this with an organized program which will enable the individual to maintain his sobriety through professional help.

It is just such a plan which Dr. Pfeffer describes in the Bellevue Medical Center relationship to the Consolidated Edison Company. Techniques are described for the discovery of early phases of the drinking problem, and an excellent medical facility for the rehabilitation of the alcoholic is provided. If attempts at rehabilitation of the employee fail, termination of his employment is usually necessary, but from the practical point of view, the success of such a company program significantly cuts down the need for such termination measures.

Education and information concerning alcoholism and the program are salutary in developing better attitudes on the part of the employee concerning alcoholism and greater acceptance of the need for treatment. Tangible benefits result for the individual in his ability to keep his job and his self-respect, and for the company in terms of marked improvement of performance and retention of frequently excellent employees.

The part of the book devoted to these fundamental concepts is most useful, and one hopes that it may be possible to extend these ideas into other fields where a combination of motivation and a program for rehabilitation may be merged in such a way as to reduce still further the incidence of crippling chronic alcoholism.

Isadore Tuerk

Krugman, Morris, ed. *Orthopsychiatry and the School.* American Orthopsychiatric Association, New York, 1958. xii + 265 pp., illus. **$4.00**

During the past quarter century there has been an increasing trend among educators to become concerned with the whole child and with the development of healthy personalities. This has resulted in a shift in thinking about curriculum and an appreciation of the contributions of psychiatry, psychology and social work to the educational process. Increasing numbers of school systems are adding consulting psychiatrists, school psychologists and social workers to their staffs to aid the classroom teacher in providing for each child his maximum educational potential.

Despite this growing rapprochement, many problems still exist between the clinical disciplines and the educator. They do not speak the same language and the individual orientation of the clinician is at times worlds apart from the group approach of the educator. The American Orthopsychiatric Association has always emphasized the team approach and in recent years has tended to include school personnel as members of the team.

Essentially a selection of papers and symposia, *Orthopsychiatry and the School* presents many viewpoints of particular interest to the educator and to the clinician working with the school. As is generally true of collections of this sort, all of the papers are not of equal readibility or clarity. Some require a broad knowledge of the concepts and theories of the clinical disciplines to be fully appreciated by the educator.

The choice of the editor for this collection is a very fortunate one, since Dr. Krugman has had the background and experience to speak for both the educator and the clinician. His brief comments preceeding each paper are of considerable help to anyone studying this material.

The organization is excellent, with the papers being divided into four broad categories. The initial section covers the contributions of orthopsychiatry to education. This is followed by a consideration of the relation of the orthopsychiatric disciplines to the problems of learning. The third section covers problems concerning school mental health. The final section deals with the topic of teacher education and the mental health aspects of the teacher's role.

In this reviewer's opinion the book is must reading for educators and school administrators concerned with present problems of mental health in schools, and in planning for schools of the future. While it solves no problems it contains many thought-provoking viewpoints and should be of help to everyone concerned with the school and the improvement of national mental health.

Charles J. Leiman

Kline, Nathan S., ed. *Psychopharmacology Frontiers.* Little, Brown and Co., Boston, 1959. xviii + 533 pp., illus. **$10.00**

This volume represents the edited proceedings of a Psychopharmacology Symposium at the Second International Congress of Psychiatry which was held at Zurich, Switzerland, September 2–4, 1957, under the Chairmanship of Nathan S. Kline and Co-